ENGINEERING NEWS-RECORD

AUG. 18, 1960

PRICE 50 CENTS

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College Construction Booms

An ENR report on the billion-dollar-a-year program now transforming the nation's campuses. *p.34*

1950

1960

1970

A McGRAW-HILL PUBLICATION

STEVENS RICE GS
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STEEL DECK GRANDSTANDS

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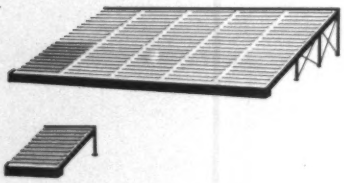
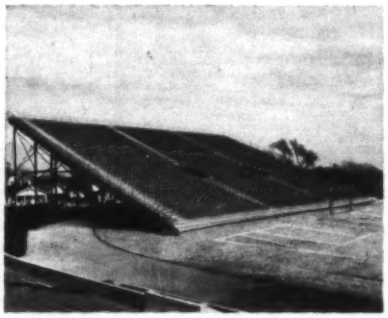
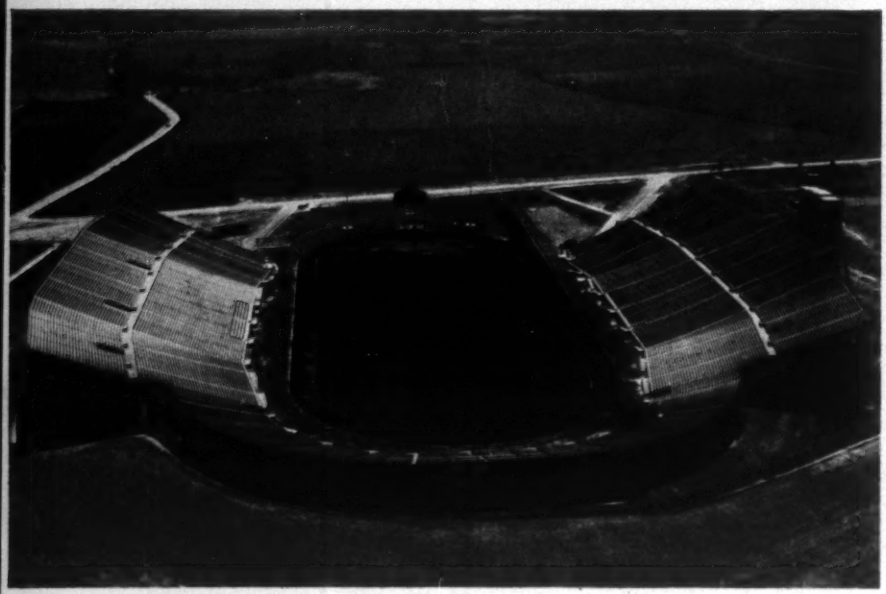


Pittsburgh-Des Moines all-steel stands are built of standard unit sections, can be any length and depth—along one or both sides of field, or in horseshoe or full oval layouts as required.

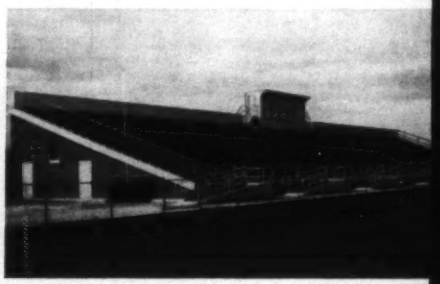
University of Wyoming, 15,000 seats



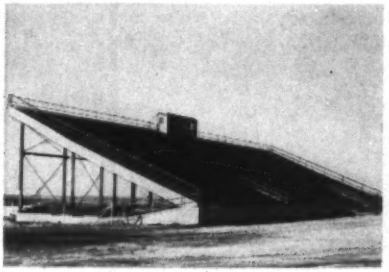
University of Tulsa, 5,500 seats



Pennsylvania State University, 45,000 seats



Allegheny College, 2,880 seats



Langston University, 3,860 seats

Complete freedom of design to meet specific site requirements is an outstanding Pittsburgh-Des Moines Steel Grandstand feature. Engineered for application flexibility, the PDM Stand can be any size or shape, can be added to at any time, even moved and re-erected at another site. With all its versatility, this famous steel stand is *permanent* . . . immune to weather or climate damage, of *known strength* and safety, fine in appearance, economical to install. Full data in free brochure. Write!

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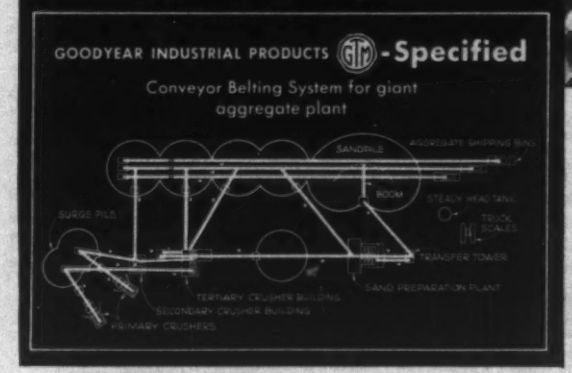
Belting a giant aggregate plant to turn out 2,200 tons an hour is a big order. But contractors need that eye-opening output for the construction of the waterways, power stations and reservoir of the $720-million Niagara Power Project. The G.T.M.—Goodyear Technical Man—was called on to study the belting needs of 51 separate conveyors. His recommendations were based on G.T.M. experience specifying for stand-out conveyor belt performance in plants, mines and construction operations the country over. Result: Over four miles of the G.T.M.'s belting now conveys everything conveyable at this plant. And before the project is completed, it is expected that over 10 million tons of aggregate will move over these belts.



No mystery why the G.T.M. gets the call on the biggest, fastest-moving conveyor-using jobs.

He—in team with the Goodyear Distributor—has earned an enviable reputation for belts that hold both tonnage and distance records. They're also your source for the finest of Hose, V-Belts and other industrial products. Just look under "Rubber Goods" or "Rubber Products" in your Yellow Pages. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

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THE GREATEST NAME IN RUBBER

5625 Sq. Ft.

Speed in Forming Symons Steel-Ply Forms

. . . Keys Rocket Progress at Vandenberg Air Force Base

By discarding traditional forming methods in favor of prefabbed, lightweight, Symons Steel-Ply Forms, a heads-up piece of construction planning has reduced time and cost estimates for a 25,000-yard concrete job at Vandenberg Air Force Base, California. The average small 10-man carpenter gang erected up to *5625 square feet in a day.*

96 percent of the 80,000 square feet of total forming area was completed with Symons Steel-Ply Forms, fillers, corner pieces and necessary hardware. About 20,000 square feet of forms, reused, formed the total surface. The forms were used successfully for haunch building, forming suspended floor slabs and beams, all types of walls, heavy mass concrete, and they were even used on one side of the flame-bucket pour.

Advance detailing and shipment of forms from stock saved at least a month's valuable carpenter-gang time in getting the job under way. Complete Vandenberg story will be sent upon request. Symons Steel-Ply Forms can be rented with purchase option.

NEW Extension Angle

12" long with detail on each end for connection to Symons Steel-Ply Panels and Fillers. Designed for ¾" plywood facing.

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ENGINEERING NEWS-RECORD, Vol. 165, No. 7, August 18, 1960

Published weekly by McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. Printed at Albany 1, N. Y. See panel below for directions regarding subscriptions or change in address. **Executive, Editorial, Advertising and Circulation Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.** OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, President; Shelton Fisher, Wallace F. Traendly, Senior Vice Presidents; John R. Callaham, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising Sales; A. R. Venezian, Vice President and Circulation Coordinator. OFFICERS OF THE CORPORATION: Donald C. McGraw, President; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, Executive Vice Presidents; L. Keith Goodrich, Vice President and Treasurer; John J. Cooke, Secretary. **Subscriptions are solicited only from persons with identifiable commercial or professional interests in construction and building. Position and company connection must be indicated on subscription orders.** United States subscription rate for individuals in the field of this publication $6.00 per year, single copies 50 cents; foreign $20 per year, payable in advance. Second-Class mail postage paid at Albany, New York. Printed in U.S.A. Title registered in U.S. Patent Office.

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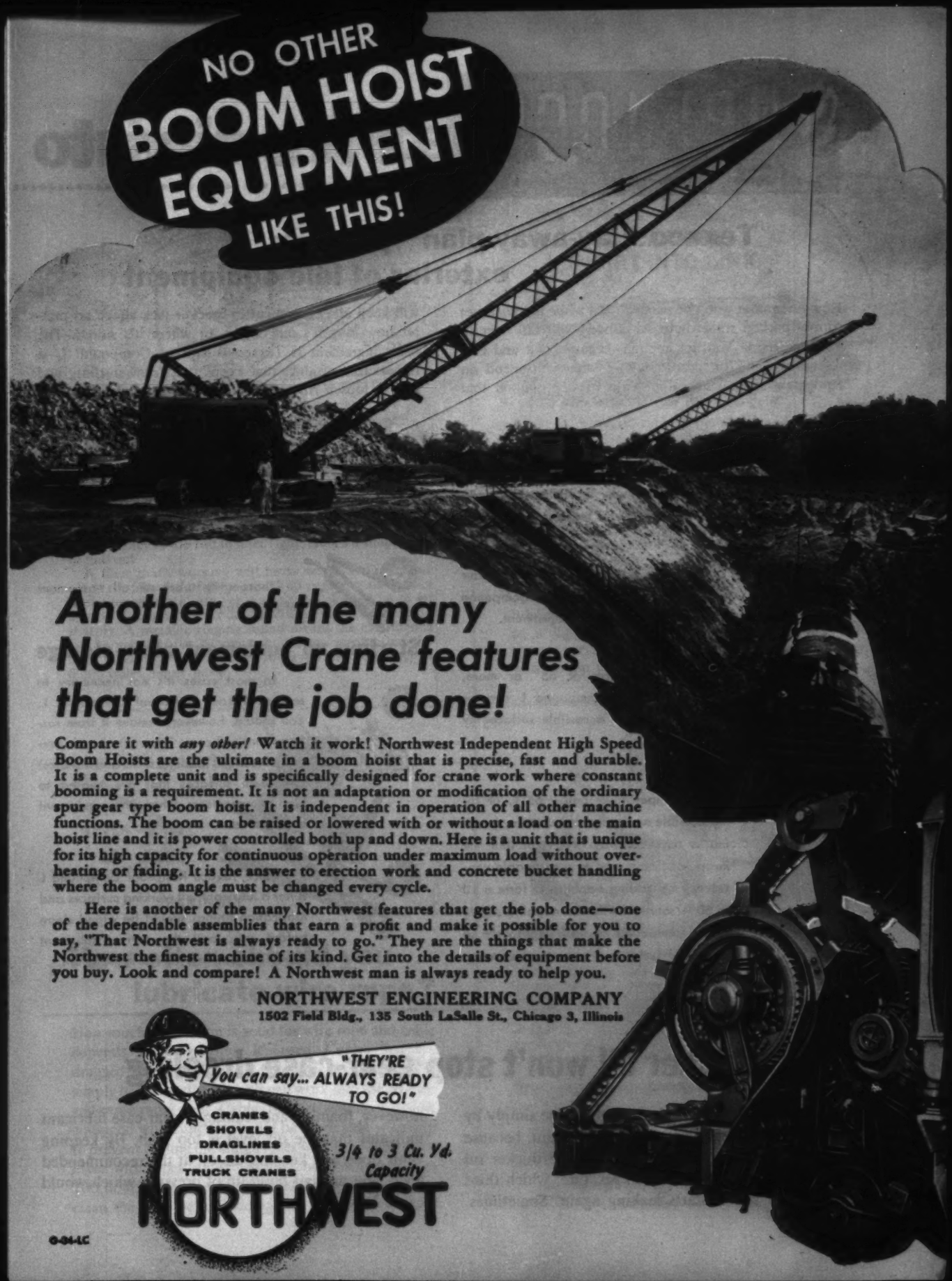

Another of the many Northwest Crane features that get the job done!

Compare it with *any other!* Watch it work! Northwest Independent High Speed Boom Hoists are the ultimate in a boom hoist that is precise, fast and durable. It is a complete unit and is specifically designed for crane work where constant booming is a requirement. It is not an adaptation or modification of the ordinary spur gear type boom hoist. It is independent in operation of all other machine functions. The boom can be raised or lowered with or without a load on the main hoist line and it is power controlled both up and down. Here is a unit that is unique for its high capacity for continuous operation under maximum load without overheating or fading. It is the answer to erection work and concrete bucket handling where the boom angle must be changed every cycle.

Here is another of the many Northwest features that get the job done—one of the dependable assemblies that earn a profit and make it possible for you to say, "That Northwest is always ready to go." They are the things that make the Northwest the finest machine of its kind. Get into the details of equipment before you buy. Look and compare! A Northwest man is always ready to help you.

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G-51-LC

LUBE LOGIC

Five tips to

Texaco "lay-away plan" protects exterior of idle equipment

Equipment that won't be needed for a while is sometimes simply parked somewhere so nobody will fall over it. Well and good, but not enough—because rust and corrosion account for almost half of what you spend on equipment maintenance. Here's a 6-step program that will keep idle equipment in cracker jack shape no matter how long it's out of use, or where it's stored. The basic ingredient is Texaco Rustproof Compound L—a remarkable product that keeps rust from starting, and acts to loosen rust that's already on the equipment.

1. Before applying Texaco Rustproof Compound L, make sure all exterior surfaces are clean and fairly dry.

2. Coat all adjustment bolts and other exposed threads with Rustproof Compound to facilitate removal or adjustment.

3. At temperatures of 65° or more, Texaco Rustproof Compound L can be applied to smooth accessible surfaces by brushing.

4. At temperatures below 65°F, or for inaccessible and complicated areas, spraying is the best way. You can thin the Rustproof Compound to a sprayable consistency by adding naphtha to form a 10 to 50% solution. Add the naphtha slowly to the compound and stir vigorously so the whole batch is the same consistency.

5. Apply tags at conspicuous points on the equipment describing the rustproofing measures that have been taken.

6. Thoroughly lubricate all equipment before storage.

Starting up equipment after storage

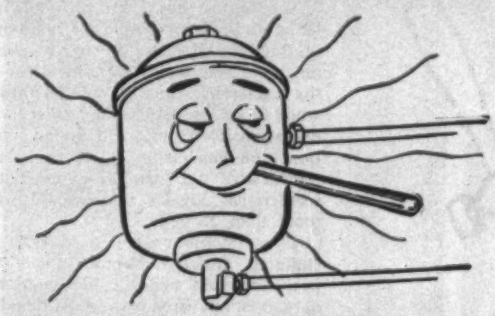
1. In most cases it's not necessary to remove Texaco Rustproof Compound L. You should, however, remove it from surfaces that will come into contact with personnel (such as ladders, seats and handles) and from surfaces that are heated to high temperatures when the equipment is operated.

2. Since Texaco Rustproof Compound L is *not* a lubricant, all working surfaces and lubrication fittings should be wiped clean before use, and the correct lubricant should be applied before starting up.

Thicker oil won't stop gear-case drooling

You can't fix leaking seals on a gear-case simply by switching to a heavier-grade gear lubricant, because in gear cases carrying heavy loads, the thicker oil simply increases gear-case temperature, which thins out the oil and it starts leaking again. Sometimes, however, foaming and leaking of gear-case lubricant indicates that the oil level is too high. By keeping vents open and keeping the oil at the recommended level, you prevent build-up of pressure which would cause leakage.

trim maintenance costs



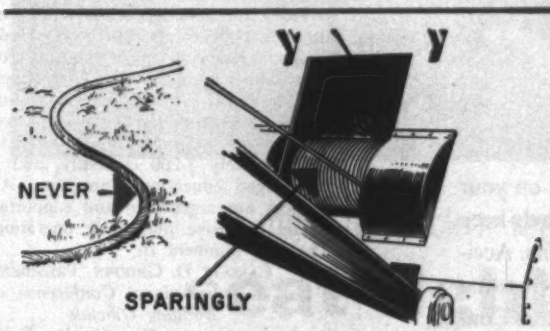
A filter that's working runs a temperature

Oil filters last so long these days it's sometimes hard to say when they were last changed. But they're so important to engine performance that it's essential that you know whether they're too full to filter right. Here's a simple way to find out.

A filter that's working will be as warm as the engine oil. If the filter on a fully warmed-up engine remains cool to the touch, it's a safe bet that it's too clogged up to let any oil through. Just to double-check, tap the filter case sharply. A metallic ringing sound means the cartridge is still in good shape. A soggy thud often means that the filter is loaded. Top mileage for even the best filter is 6,000 miles, never more.

Crawler treads are happier dry

There are few places where good lubrication is more important than in track-roll bearings, but make sure you don't lubricate the crawler treads themselves in a burst of enthusiasm. The pins that connect the links of crawler treads are designed to operate without lubrication, because dirt or other abrasives would act as a lapping compound in service. Result: much shorter service life for the track. Moral: if you don't want to lap your crawler link pins, don't oil them.



How often should you lubricate wire rope?

How much lubrication is good for wire rope and cable depends mainly on how it's used. Cables that are dragged in dirt shouldn't be lubricated at all. Oil simply holds the dirt where it can work into the strands and cause rapid wear. Cables that are wound on drums equipped with clutches should be lubricated sparingly to prevent fouling the clutch faces with lubricant. With other wire ropes, apply Texaco Crater A every 10 to 100 hours as necessary to avoid dryness. Be sure to clean the rope before adding new lubricant.

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Reader Comment

ICBO Is Doing Fine

SIR—We sincerely regret that a magazine of your professional standing saw fit to print an item (July 7, p.28) relating to the International Conference of Building Officials, which cast doubt on the present status and operations of the Conference and its administration when in reality the Conference is in an exceptionally strong and sound position both financially and as to its administrative staff who have served the Conference loyally and capably for more than 25 years.

The International Conference of Building Officials, whose 1959-1960 president is the writer, is headquartered at 610 South Broadway, Los Angeles, and is the largest building officials organization in existence, having over 700 members and 1,200 cities operating under the Uniform Building Code. The organization has grown from an annual income of $7,000 to an annual income of $290,000 since the existing management was placed in charge in 1938. As a partnership, Mr. and Mrs. Colling had been conducting the Conference publishing operation for several years prior to becoming officially connected with the Conference in an administrative capacity. Operations of the International Conference of Building Officials are under the direction of the Executive Board and in addition financial operations are supervised by the Budget Committee. All expenditures are carefully screened by both before approval.

The International Conference of Building Officials services now include research reporting, plan checking for cities who are understaffed as to engineers, maintenance and promotion of the Uniform Building Code, which has grown from 215 adoptions in 1938 to approximately 1,200 currently, and a full-fledged educational program. All services are augmented and supported by an extensive publishing operation. The staff numbers 16.

CASSATT D. GRIFFIN, PRESIDENT
International Conference of Building Officials
Los Angeles, Calif.

Trainer Takes a Bow

SIR—I hasten to add a note to the letter (ENR June 30, p. 9) concerning "Preboring Sinks Piles the Quiet Way" (ENR Apr. 28, p. 25). The earth auger that was originally tested and used for the T & T job described was the "PolerBore" manufactured by Trainer Associates.

The Trainer High Spiral PolerBore Auger was used to cut through rocky ground during the first stages of this sewer job.

NEWLIN T. BOOTH, *President*
Trainer Associates
New Castle, Del.

(Reader Comment continued p. 14)

ALLIS-CHALMERS

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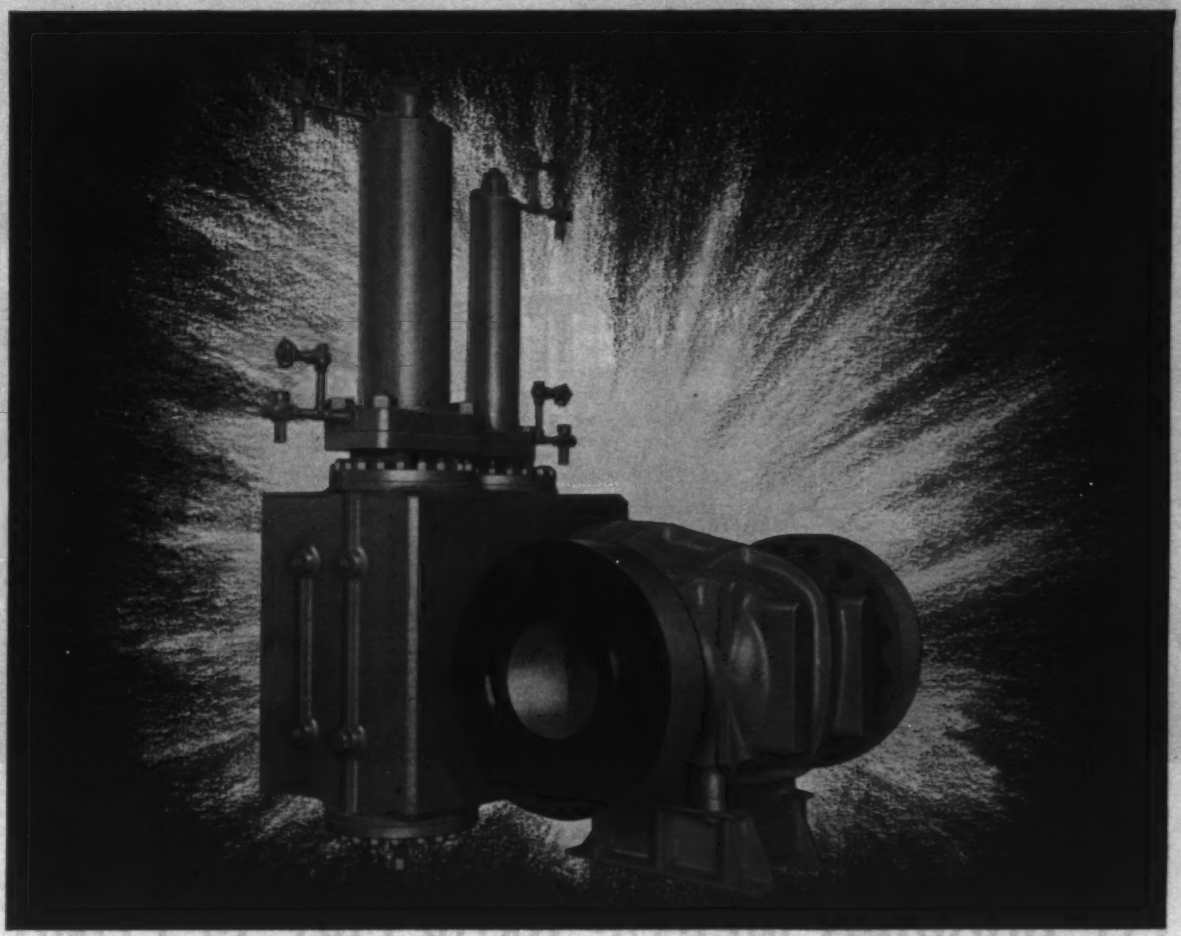


Rotovalve unit for 2700-psi, 1050 F service

A must for nuclear reactor service . . . valves that

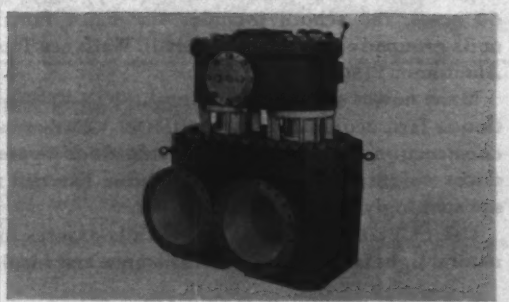
seat tighter with use

***Rotovalve* units accurately control or shut off** in high-temperature, high-pressure reactor applications. Units feature lantern ring with double packing, pressurized with the line fluid or purged to a bleed tank at lantern ring.

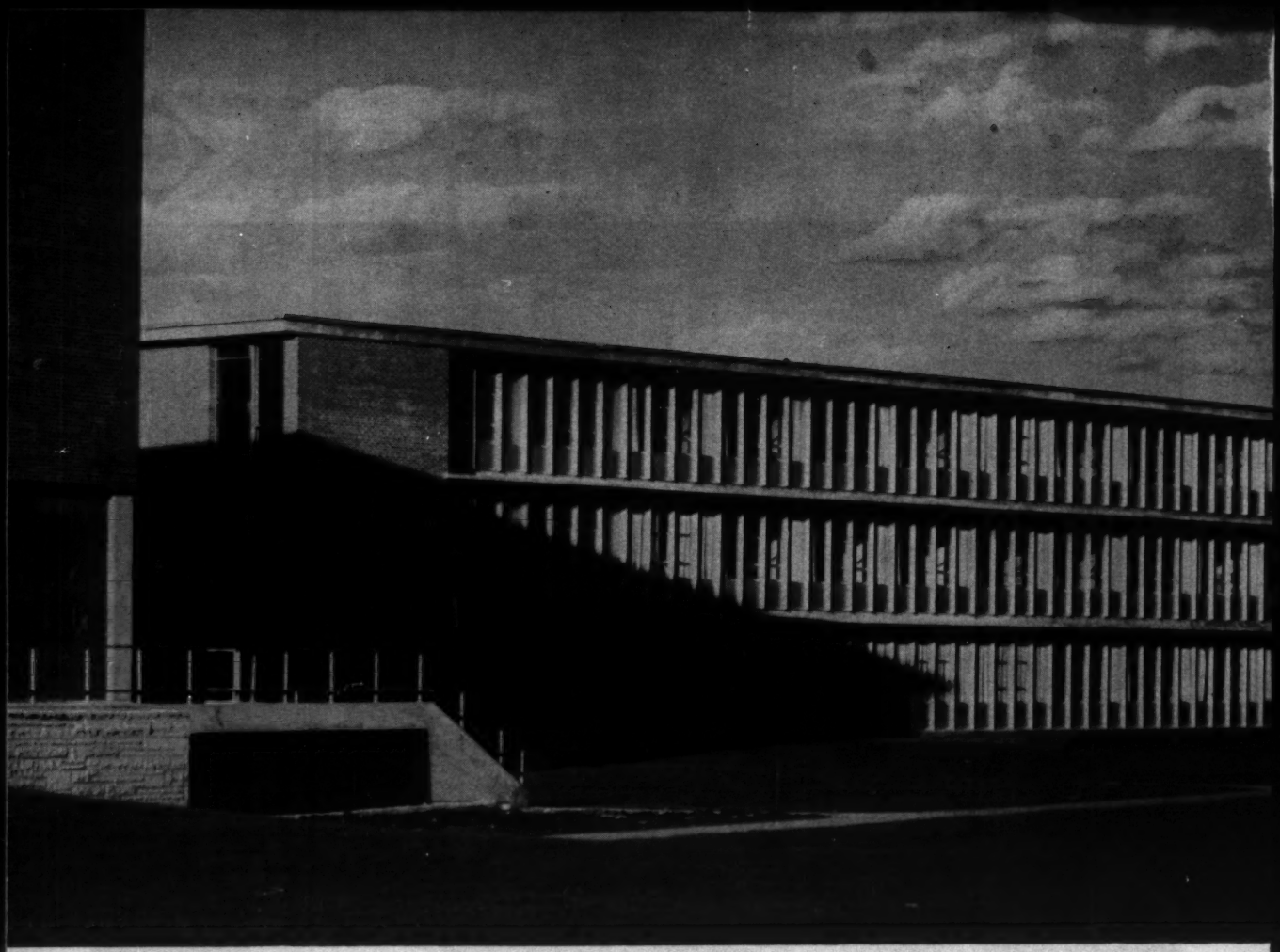
One example of current manufacturing is a 10-inch *Rotovalve* unit for operation at 2500 psi, 2500 F. Also being engineered is a 12-inch size for service at 4000 psi; 4000 F. Still another type combines a pair of valves within a single housing for use on dual, concentric pipes. Inner pipe carries 1400 F CO_2 to reactor; outer, 700 F CO_2 away from reactor.

Your Allis-Chalmers representative can arrange reactor valving engineered to your specific requirements. He also supplies a complete line of butterfly valves, including models for air-lock valving. *Contact him for detailed information, or write* **Allis-Chalmers,** *Milwaukee 1, Wisconsin.*

Rotovalve is an Allis-Chalmers trademark.



Duplex *Rotovalve* unit features a single operator — controls 1200-psi, 600 F steam, or 1500-psi, 300 F air. Operator allows both valves to open simultaneously, or one to open while the other closes. Saves space vital where entire reactor unit must be enclosed in radiation-proof structure.



TRUSCON VISION-VENT CURTAIN WALLS FIT PROVISO WEST'S PARK-LIKE SETTING

A big school with a small school atmosphere is the way they describe the new Proviso West Township High School, Hillside, Illinois. Occupying a site of 60 acres, the school includes six major functional units grouped around a central mall. Walls are Truscon Aluminum VISION-VENT®.

Many newer schools are going VISION-VENT. Erection is fast, economical. And VISION-VENT skin-type construction provides more usable floor space, reduces weight on frame and foundation. Exterior walls are strikingly modern and beautiful.

Use of VISION-VENT Curtain Walls assures higher natural light factor, good fire-resistance and insulating value, better ventilation. Panels can be provided with louvers for heating or ventilating systems.

VISION-VENT Curtain Walls offer a selection of practically any type of window—double-hung intermediate projected, and many others in steel and aluminum. Trim modern appearance. VISION-VENT is available with a choice of high-gloss panel colors, porcelain enamel, stainless steel, or aluminum.

For all the advantages of modern curtain wall construction—combined with the exclusive feature of ventilated, insulated panels integrated with steel or aluminum windows—investigate Truscon VISION-VENT. Send coupon for full information.

Proviso West Township High School—Hillside, Illinois
Architects: Perkins & Will
Contractor: Powers Construction Company
Product: Truscon Aluminum VISION-VENT Curtain Walls

REPUBLIC ELECTRUNITE TUBING for mechanical and structural applications, is available in both carbon and stainless steels in a wide range of sizes and wall thicknesses—rounds, squares, and rectangles. This modern building material has unlimited freedom in design. Both beautiful and functional. Lightweight, easy to handle. Here, ELECTRUNITE Stainless Steel Tubing, in 2″ and 1¼″ squares, was used for handrails and Newell Posts in this modern office building. Write for Brochure SA-STR-60.

TRUSCON STEEL AND ALUMINUM WINDOWS preserve the beauty and dignity of modern institutional architecture. Truscon Intermediate Projected and Intermediate Casement Windows, above, complement this portion of the Wheat Street Baptist Church Educational Building, Atlanta, Georgia. Architect: Edward C. Miller; Contractor: Barge Thompson, Inc. Write for additional information.

TRUSCON "O-T" OPEN TRUSS® STEEL JOIST is designed to fulfill your building ideas. Straight-bottom end to carry to spandrels and columns. Economically extended end. Designed in balance with all other structural elements. Cold formed steel sections not only make an exceptionally strong joist, but also add a pleasing appearance. In cooperation with the Steel Joist Institute, Truscon is marketing this new joist designed to 20,000 psi working stress. Send coupon.

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☐ ELECTRUNITE® Structural Tubing—Brochure SA-STR-60
☐ Truscon Steel Windows ☐ Truscon Aluminum Windows
☐ Truscon "O-T" Open Truss Steel Joist

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Firm_____

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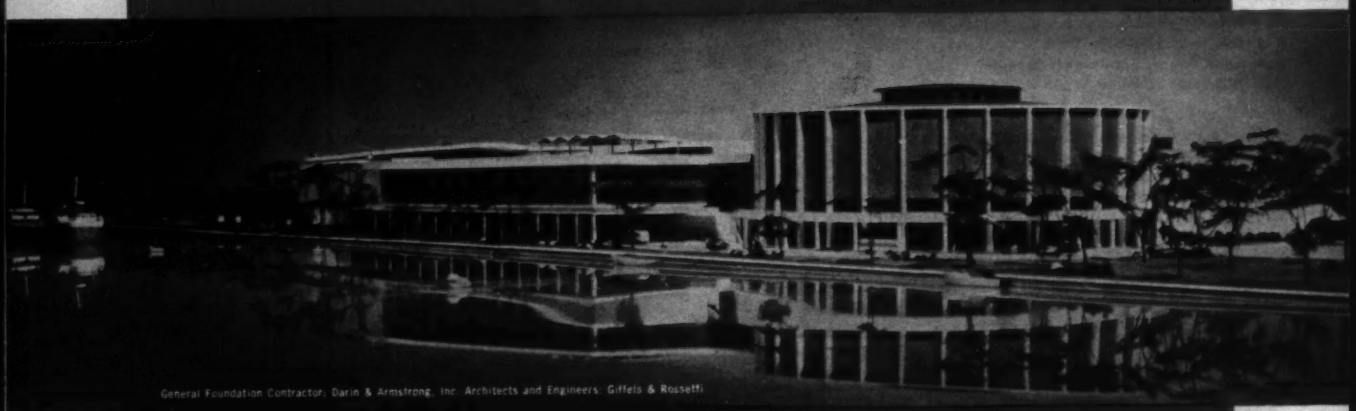
The Motor City's New Convention Facility Stands On RAYMOND Foundations



General Foundation Contractor: Darin & Armstrong, Inc. Architects and Engineers: Giffels & Rossetti

Rising proudly on a foundation by Raymond, Detroit's new Cobo Hall completes the vast complex that is the city's Civic Center. With the new City-County Building and the Ford Auditorium (both also on Raymond foundations), Cobo Hall furnishes the ample convention facilities that have been so sorely needed in this booming city. Including 1,632,990 square feet of usable space and room for 12,500 people at meetings and other functions, Cobo Hall will first play host this October to the National Automobile Show. *The Foundation:* 4,341 one hundred and eight foot pipe step-taper piles, for a total of 468,828 linear feet. Detroit's Cobo Hall is another new star in the galaxy of great public buildings large and small, supported by Raymond Foundations. So whatever your needs in foundation construction, give us a call. We can handle almost any problem with men, material, and experience – quickly and economically.

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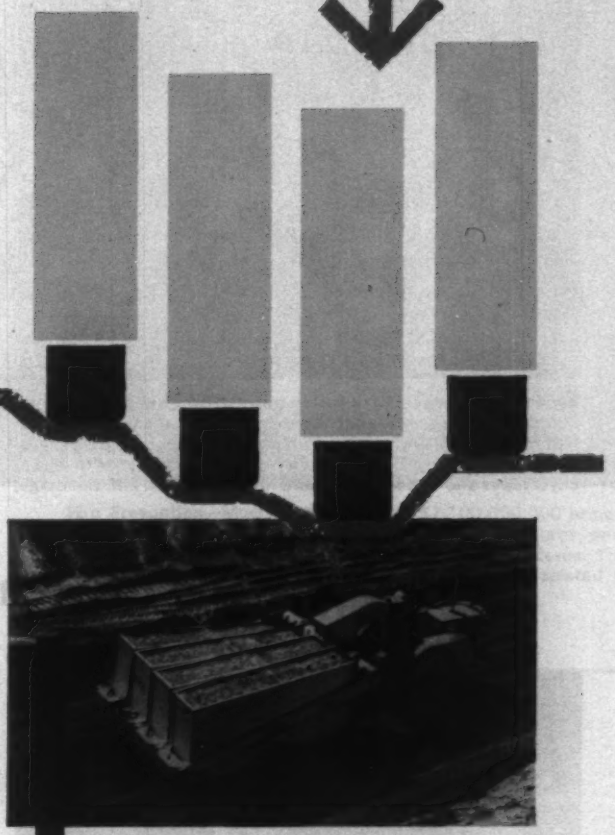
Foundations For The Structures Of America
Complete Construction Services Abroad

UNIFORM COMPACTION WAY DOWN DEEP

Exclusive with Yuba-Southwest Compaction Rollers: Independent oscillation gives constant wheel load — regardless of soft spots or boulders.

You'll find a flexibility and much greater compaction uniformity over conventional single box type rollers in the patented design now available in Yuba-Southwest Multiple-Box Rollers.



The amazing amount of work these units will do has been thoroughly proved by tests under all earthfill conditions. Uniform compaction of heavy or soft lifts, regardless of rocks, is accomplished with fewer passes and with greater efficiency than by any other tamping method. A major design feature is in the individual weight boxes and wheels: each assembly is mounted independently for full vertical oscillation, providing a constant wheel load no matter what the terrain. Bridging or load shifting is eliminated, and the Yuba-Southwest Multiple-Box Roller rides slopes smoothly with greatest possible stability.

You get up to three times as much tire life, too, over single box type rollers with their limited oscillation. Costly overwear and frequent blowouts are a thing of the past.

Why not get full information on this outstanding, money-saving equipment today. Choose from five models: 10 to 100 tons rated capacity. Adaptable to any job. Assembled in any combination of 3 to 6 boxes with flanged yoke.

Yuba-Southwest also manufactures
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SELF-PROPELLED ROLLERS
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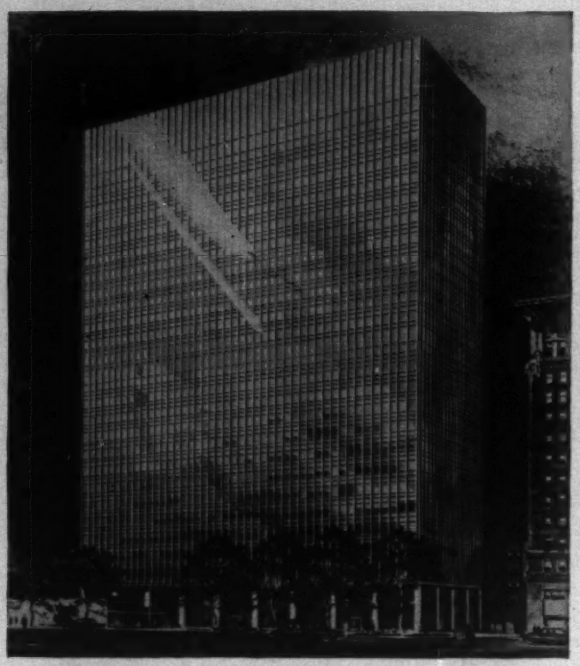
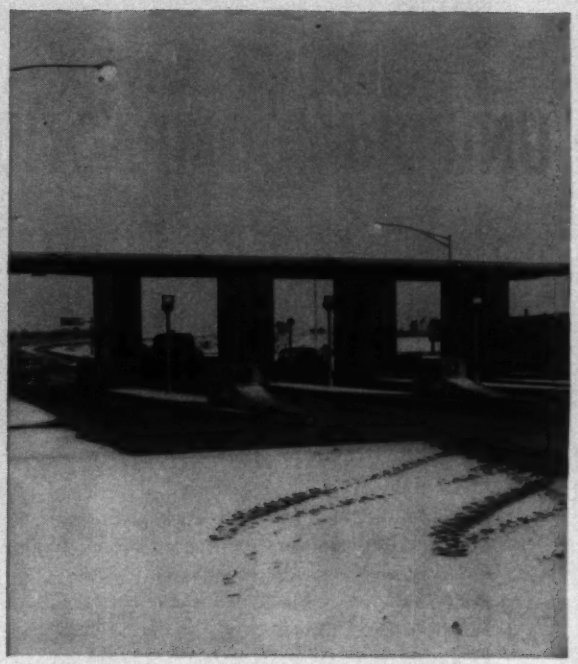


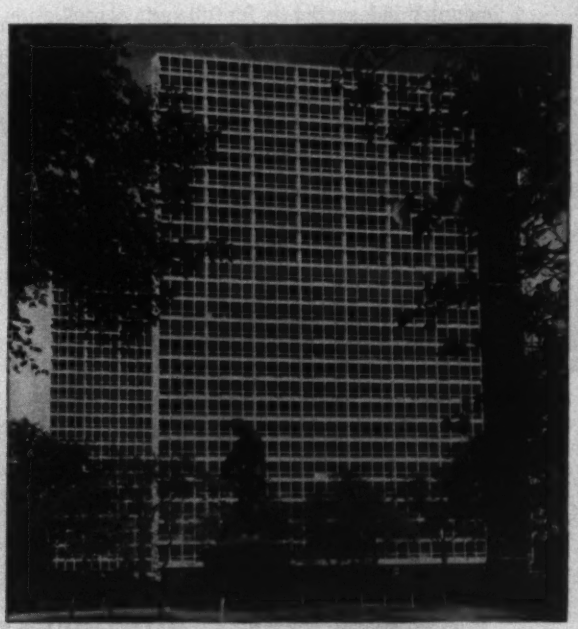
Vent and Drainage—Time-tested galvanized steel pipe gives assured maintenance-free service at low cost. That's why it is specified for drainage and vent lines in major buildings such as Cleveland's Illuminating Building, New York's Coliseum, the Seagram skyscraper and Socony-Mobil and Mutual Benefit Life Buildings.



Snow Melting—Beneath the toll gates of the Indiana Turnpike and the Calumet Skyway, as well as on the ramps of the New York Port Bus Terminal and Staten Island Ferry, steel pipe keeps pavement approaches clear of ice and snow for safe and controlled vehicular movement all winter through.

Steel pipe serves best in many ways.

Radiant Heating and Cooling—In Salt Lake City's First Security Building, steel pipe serves a dual function. It carries steam for heating and chilled water for air conditioning. Logically, too, for steel pipe has proved efficient for heating and refrigeration, as well as icemaking, in over 70 years of service.



Electrical Conduit—When vital services depend on electricity, as in Chicago's Commonwealth Promenade Apartments, it's natural to protect this power with sturdy, rigid steel conduit. Imbedded in concrete, enclosed in walls or exposed—rigid steel conduit meets all local, state and national building codes.

Fire Prevention—Much of the nation's $1,100,000,000 annual fire losses might have been prevented if all structures were equipped with efficient, steel pipe fire sprinkler systems. The cost of such built-in, 24-hour fire protection, when related to potential losses, is truly an economical investment.

. . many places

Steel pipe is the modern metal tubular product easy to engineer and install.

Indoors or out, overhead or underground, in walls or exposed—*steel pipe* means durability and economy. It's easy to work, economical, readily available. It meets local, state and national codes. Its proved record of performance makes it the most widely used pipe in the world.

Steel pipe serves well and long in vital services affecting American life and business . . . for vent and drainage, fire sprinkler systems, snow and ice melting, radiant and conventional heating, air conditioning and gas, air, electrical and water lines.

In many ways and many places *steel pipe* serves best. To learn about how, why and where—consult your local *steel pipe* distributor or steel company representative or write the Committee's Research Engineers for specific application literature.

STEEL PIPE IS FIRST CHOICE

- Low cost with durability
- Strength unexcelled for safety
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Insist on MADE IN U S A Steel Pipe

C-5

COMMITTEE ON STEEL PIPE RESEARCH

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That's what Bill Holland says about the Model H-70 "PAYLOADER" tractor-shovel he operates for Arnold's Custom Landscaping in Mesa, Arizona. Besides doing excavating, grading and truck loading in the granite pits, they specialize in demolition and razing work, preparing sites for new construction.

For example . . . The working versatility of the H-70 really paid-off recently when it took less than two days time to tear out a hard, 2-inch asphalt driveway, parking pavement and the foundation of an old restaurant and filling station in clearing a 100 x 150-ft. area for a new, modern building.

A dependable "PAYLOADER" can be the key machine in your new construction, repair and maintenance work, too. The versatility of these units plus their rugged strength, dependable performance and big capacity protects profits on any material handling job. A Hough Distributor will gladly demonstrate the wide selection of interchangeable attachments available that *save time* on the job and the *high cost* of single purpose machines.

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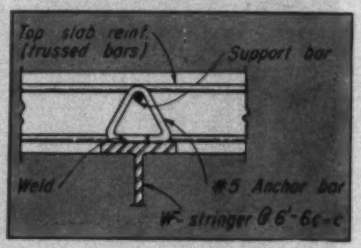
. . . Reader Comment



On the Beam

SIR—This is in reference to your editorial "Simpler Shear Transfer" (ENR June 16, p. 96) and Homer M. Hadley's article "Shear Transfer Can Be Simple" (ENR May 26, p. 45).

Mr. Hadley's scheme must include vertical anchorage of the concrete slab to the beam flange which is necessary for a safe design.

Anchorage is provided by stud bolts, channels, Z bars, spirals, and other similar devices.

All these schemes, including Mr. Hadley's blobs of weld metal, require the same amount of weld metal as they all must be based on the horizontal shear developed between the beam flange and the concrete slab.

The writer recently designed shear connectors for Shelby County, Tenn., using channels to facilitate field welding.

I am now proposing an alternate plan of welding the reinforcing steel direct to the beam flange together with a triangular vertical bent bar, also welded to the beam flange acting as a shear connector and as a high chair to support the floor slab reinforcing. These triangular-shaped bars are spaced as required to take care of horizontal shear and slab anchorage at the varying requirements.

The above sketch for a cast-in-place slab illustrates the general idea. To repeat, no extra welding is required except a small amount for the anchor bars, acting also as high chairs.

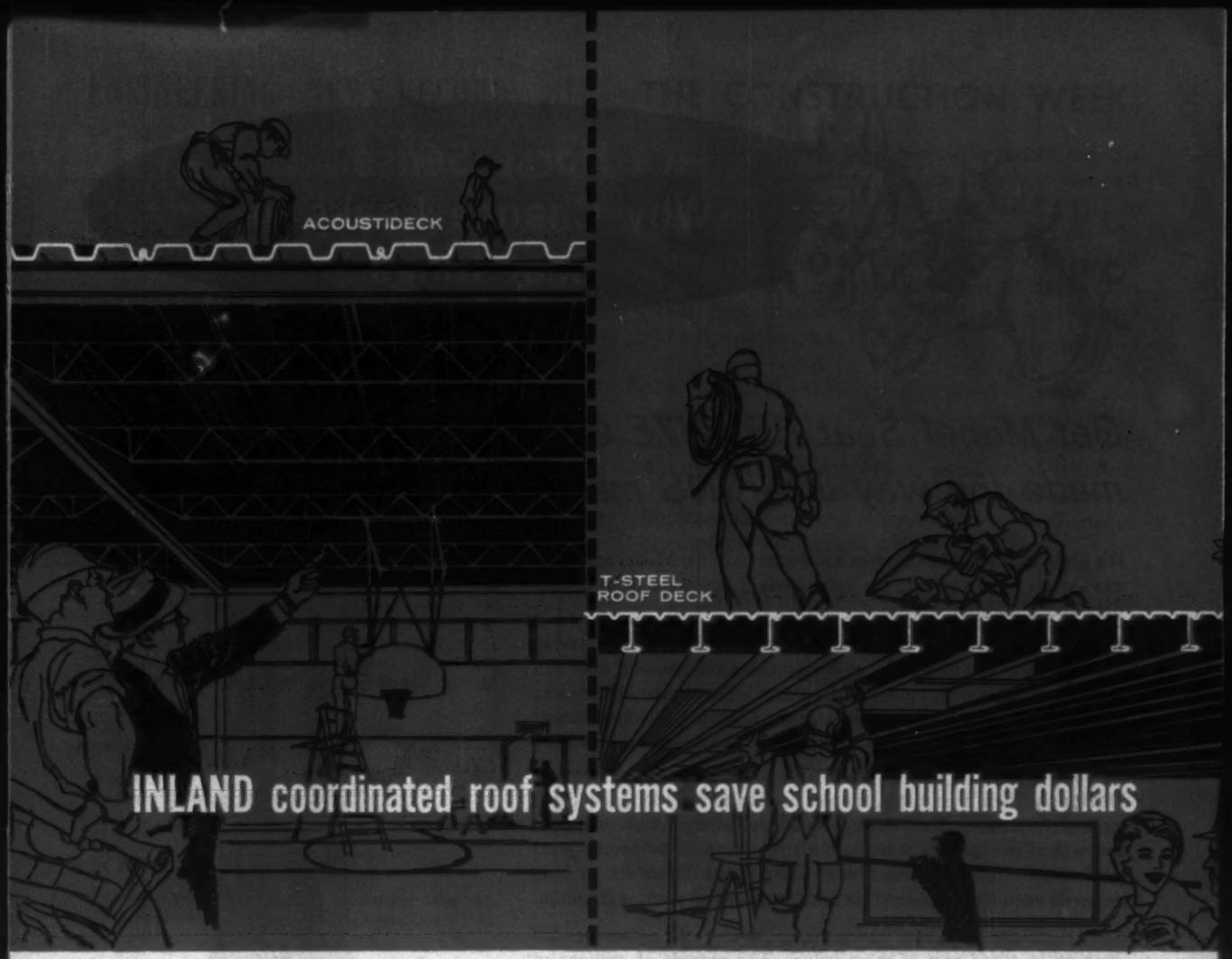
There is considerable bond between concrete slab and beam flange without connectors, but connectors are required by AASHO specification for composite design.

As stated above, reinforcing steel welded directly to beam flanges is proposed as an alternate to 4-in. channel shear connectors. The part of the channel resisting horizontal shear is specified as $h + t$ by Bureau of Public Roads tests.

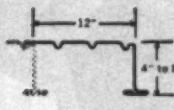
For 4-in. channels weighing 5.4 lb per ft this is about 0.60 in. as compared with a #5 reinforcing bar, which has a height of .625 in., thus offering slightly more resistance to horizontal shear than would offered in the 4-in. channel.

The triangular tie-down bars can, of course, be spaced to suit anchorage requirements.

VERNON H. SMITH,
Structural Engineer
Memphis, Tenn.



INLAND coordinated roof systems save school building dollars



T-STEEL — New! Galvanized. For clear spans to 32'0". Adaptable to acoustical and flush, luminous treatments. Provides superior diaphragm to resist seismic and wind loads.

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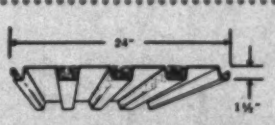
Surface-mounted Fixture — Lath-and-Plaster Fireproofing



TYPE B ACOUSTIDECK—For purlin spacings to 10'. Uses minimum of 1" rigid insulation board.

TYPE C ACOUSTIDECK—For purlin spacings to 24'0". Uses minimum of 1½" rigid insulation board.

EP-6A

...Complete structural systems permit a range of ceiling, lighting, and acoustical treatments within budget limitations

Acoustideck serves as a combination steel roof deck and acoustical ceiling with a Noise Reduction Coefficient of .70. It is especially practical over gyms and other activity areas.

Panels are erected fast in any weather that a man can work. Since the panels are Bonderized, then covered with a baked-enamel prime finish, field-painting costs can be cut in half because only one finish coat is required normally. The fluted underside is left exposed as an attractive ceiling.

New T-Steel Roof Deck allows you design freedom in covering classrooms of 26' to 32' spans. You can specify various types of acoustical tile — provide a flush, luminous ceiling — or leave the underside of T-Steel exposed and paint it. You provide a superior diaphragm to resist seismic and wind thrusts.

Write for catalogs 240, 241, and 246 — or see Sweet's, sections 2c/Inl and 11a/In. For help on unusual problems, you can draw on the diversified experience of Inland sales engineers. Write or call your nearest Inland office.

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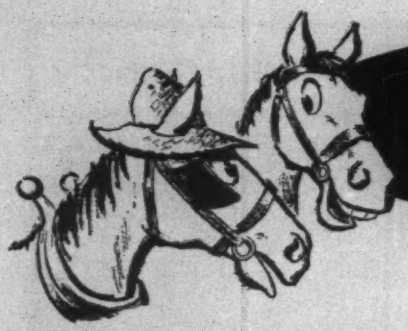


It's Horse Sense . . .

Why Chance Leaks in Seat Rings

Get Monel Seat BRONZE GATES made the way JENKINS makes them

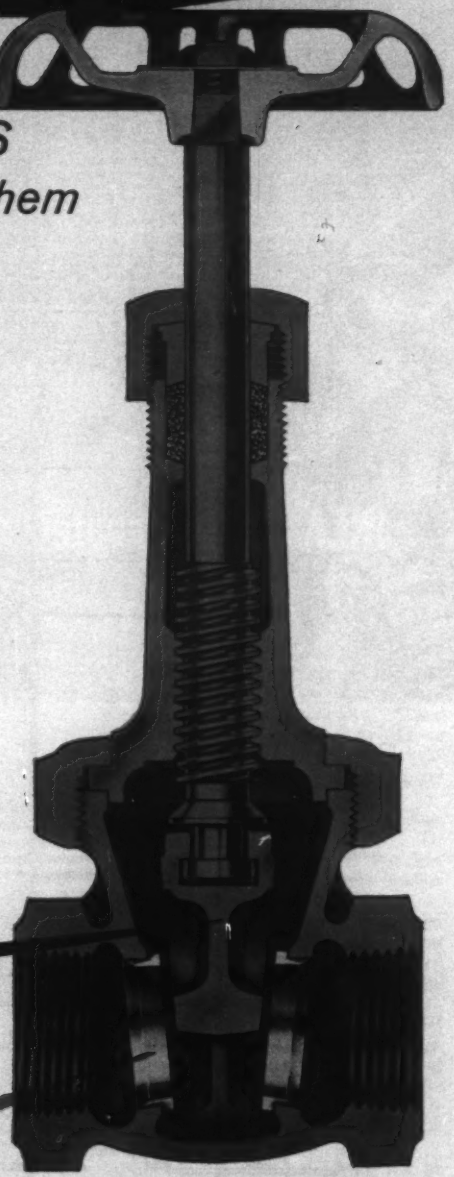
It's plain horse sense that you had better have the Monel seat rings EXPANDED (ROLLED) into the valve body if you want them to stay tight and leak-proof.

More horse sense . . . there's nothing valuable lost through having seat rings that can't be replaced by a regular maintenance man . . . **IF** the bronze or nickel alloy wedge has a lower degree of hardness than the heat-treated Monel seat rings. *(The way Jenkins makes them)* Then, the wedge takes the wear and seat rings are relatively unaffected.

Obviously, there's no faster, simpler or cheaper way to renew tightness and efficiency than to slip on a new wedge. And that, plus renewal of packing as needed, is all you need do to assure good performance from Jenkins Monel Seat Bronze Gates for as long as you'll need to care. Good service for scores of years is common.

Long, low-cost life also results from greater-than-ever-needed strength in every part of these valves. The records of millions of Jenkins Bronze Gates show you get full protection against all the stresses encountered in use.

Your local Jenkins Distributor will quickly supply your needs from a wide variety of Jenkins Bronze Gates. For information about these valves, write for folder No. 181-C. Jenkins Bros., 100 Park Ave., New York 17.



WEDGE is less hard than seat rings. Wear affects this easily replaceable part . . . NOT seat rings

SEAT RINGS are expanded (rolled) into body. Permanent, all-around support is essential to prevent deforming, loosening, shifting, LEAKS

JENKINS VALVES

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ENGINEERING NEWS-RECORD

Vol. 165, No. 7 August 18, 1960

Number of copies printed in this issue 86,281

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THE CONSTRUCTION WEEK

FIRMER PRICING—Equipment distributors expect a rebound in construction equipment sales in the next few months—enough to offset the first-half's 15% to 20% decline in business, according to a survey by Associated Equipment Distributors. Should such a recovery develop, it might check current shading from book price, smaller turn-in allowances and stricter terms for contractors (ENR July 21, p. 105).

FAIR NOTICE—Architectural, engineering and construction contracts for the New York World's Fair will flow from the exhibitors, not the Fair management. So announced Robert Moses, president of the Fair. Theme for the '64-'65 event: Man's achievements in an expanding universe. Symbol shows the Earth in orbit around the Sun and a path to the stars.

JUST IN CASE—The Senate version of the construction industry's situs picketing bill was amended by the Senate Labor Committee this week to make clear that the bill would not legalize the boycott of products intended for use at a construction site. Up for consideration later this week is another amendment that would exempt work at missile sites from the bill's application.

DAM TRIO OFF TO EUROPE—Three Bureau of Reclamation dam specialists start this week on a two-month study tour of dams in France, Italy, Switzerland and Portugal. They expect to gain information for a comparison of U. S. and European practices. The engineers are Merlin D. Copen, a specialist in mathematical stress analysis; George C. Rouse, model studies and instrumentation; and George B. Wallace, construction methods and materials.

EASIER CREDIT—Reduction of the discount rate by the Federal Reserve Board, following its move to increase lending power of commercial banks, points to a period of easier credit ahead. Interest rates, on the decline for some months, will move lower still, and encourage borrowing by state and local governments for construction. A big surge in borrowing demand, however, could halt the decline in rates in the fall.

A MARK TO SHOOT AT—Denton Construction Co., Grosse Pointe, Mich., Claims a new world record for concrete highway paving. In one 12-hour working day, crews laid 7,250 ft of pavement, 24 ft wide, 9 in. thick, using a single automatic batching plant.

JET-PROPELLED DIRT—Moscow Radio reports development of the "first Soviet jet earth-digging machine," with capacity of 4,000 tons per hour. Blast from a jet engine is used to remove rock to a depth of 6 ft over a strip 6 ft wide and throw it up to 100 ft away, according to the report.

Project: McMillan Street Pumping Station, Jacksonville, Fla.
General Contractor: The Auchter Company
Engineers: Metcalf & Eddy, Boston, Mass.

Slopes withstand torrential rains as wellpoints...

Control 32′ of Water in Sand and Porous Limestone

Many contractors know from hazardous experience that porous limestone at subgrade is a "tough nut" soil to dewater. Compounding that problem, the property limits of this site were so close to the excavation area that open cutting would require steep slopes in the overlying sand. It seemed questionable whether the slopes could withstand the heavy Jacksonville rainfall.

• **Steel sheeting mandatory?** Though many thought so, The Auchter Company was confident that, with proper handling of the ground water and surface run-off, it could open cut the excavation.

• **Auchter called for a Griffin wellpoint system to control** 32 ft of water in this tricky soil. Plastic sheets were placed at pump stations to prevent undermining by the torrential rains. Photo shows subgrade dry and slopes stable... another successful dewatering job by Griffin.

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25th YEAR

WASHINGTON OBSERVER

- **Reclamation money coming**
- **Big plans for inland waterways**
- **U. S. aid for Latin housing?**

● **The Bureau of Reclamation has spelled out where it will spend $294 million for construction during the fiscal year just beginning.** Congress hasn't yet passed the appropriation for the program, but the House and Senate versions of the money bill are solid enough and far enough along to provide the basis for the breakdown. The total is some $88 million more than the Bureau spent last year.

Some $6.3 million will be spent on six new starts: Vale Project, Ore., $173,000; Curocanti Unit, Colo., $1.4 million; Florida Project, Colo., $750,000; La Feria Division, Texas, $500,000; Yellowtail Unit, Montana-Wyoming, $2.5 million; Almena Unit, Kan., $1 million.

Projects getting the most money include Central Valley, Calif. (most of it to Trinity Dam), $52.6 million; Glen Canyon Dam, Ariz., $53.5 million; Flaming Gorge Dam, Utah, $12.8 million; Navajo Dam, N. M., $12.2 million; Twin Buttes Dam, Texas, $11 million; Missouri River Basin transmission lines, $22.5 million.

—

● **Billions of dollars of Corps of Engineer work on the inland waterways is foreseen by a survey** made by the Corps for the Senate Committee on Water Resources.

Over the next 40 years, the Corps suggests, some 3,000 miles of waterways could be added to serve areas not now served. And 10,000 miles of the existing 20,000 mile system can be expanded in capacity. Total cost: $7.9 billion.

All told, 10 new waterway prospects are suggested. Among them: a connection between the Ohio River and the Great Lakes, up around the Youngstown-Pittsburgh area; extending the Trinity River to Dallas; extending the Arkansas River to Oklahoma City; extending the Big Sandy into Kentucky and West Virginia coal fields; extending the Kaskaskia to the southern Illinois coal fields; and extending the Columbia system.

Congress has already authorized some 1,300 miles of new waterways at an estimated cost of $3.5 billion, but has yet to appropriate the funds to start any of them.

—

● **President Eisenhower's Latin American aid program includes an ambitious housing proposal.** The Administration is seeking a $500-million authorization during the extra session of Congress (appropriations will be sought next year). The accent is on public works, such as construction of schools, highways, hospitals and basic power installations.

The public housing proposal is similar to a plan that has been successful in Puerto Rico. The U. S. aid would be used to plan and encourage projects that would be financed by private lenders.

POWER-SET OUTRIGGERS

World's fastest outriggers set in about a minute

You can move more, lift more, earn more with "Power-Set"® Outriggers on Lorain Moto-Cranes. Just move in and let four hydraulically-powered curved beams take over. Rough terrain's no problem. Each beam is independently controlled and pivoted floats adjust to uneven or sloping ground. You get quick positive leveling the easy way. Wedge locks take over automatically for positive security.

Fast move-ups. Move around a lot on the job? Then "Power-Set" Outriggers will save you hours! In just 20 seconds all four outriggers retract to an eight-inch clearance for on-the-job moves. Another 20 seconds and they're reset, ready to go. They are so fast you no longer have to sacrifice maximum capacities to get rubber-tire mobility.

Contractors going places choose Lorain. For Lorain delivers the pace-setting features that build profits. "Power-Set" Outriggers . . . the 10-year warranted "Shear-Ball"® turntable connection . . . Square-Tubular-Chord booms—these are some of the design innovations that will pay off for you when you go Lorain. See your Lorain distributor.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

Campanella & Cardi Construction Co. of Warwick, R.I., finds that fast-acting "Power-Set" Outriggers on its 35-ton Moto-Crane speed operations. Equipped with a 70-ft. boom, this Lorain works on grading, drainage and bridge construction on Interstate Route 95 near Attleboro, Mass.

LORAIN® ON THE MOVE

PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

Defense Secretary gets the word—

At a meeting in the Pentagon with the designers and builders of Atlas and Titan bases, Defense Secretary Gates (right) asked for their ideas on how to speed up the ICBM base building program. ENR presents a summary of contractor and A-E suggestions as . . .

Missile Base Builders Speak Up

The Pentagon is getting suggestions on how to reduce the lag in missile base construction from the men who know, the construction and A-E contractors who are designing and building them.

Defense Secretary Thomas Gates called a top-level conference July 29 in Washington to discuss the missile base lag and how to get rid of it. Sprinkled among a galaxy of generals' stars were executives from 30 construction companies and architect-engineering firms that have ICBM base contracts.

Secretary Gates laid it on the line, outlining the importance of the missile bases to the nation's policy of deterrence. Without bases on which to install the Titan and Atlas ICBMs, there are no combat-ready missiles. Without these there is no deterrent.

The generals and the Defense Secretary said what they planned to do, such as reorganize the administration of the base program and raise the standards for bid qualifications. When it was over Mr. Gates asked the builders and the A-Es to put in writing any suggestions they had for speeding up construction of bases for the Atlas and the Titan missiles.

The response has been heavy, with many of the letters running to four and more pages. ENGINEERING NEWS-RECORD has sought after and received copies of some of these letters and the gists of many others. Most of them deal with the same aspects of missile base work.

The constant influx of change orders is blamed for most of the delay in base work. Next on an unpopularity poll would be slow payment, uncoordinated inspection, inadequate specifications, poor cooperation from labor and the lack of authority for Corps of Engineer field officers.

• **Cut down change orders**—Change orders are inescapable, part of missile base building. Because of the urgency of the entire ICBM program—the need to have more missiles on launching pads than the Soviet Union has—contractors have had to build bases for missiles that were still in the development stage. And these bases have had to be changed to meet the changing demands of the emerging missiles.

"Every time there's a firing at Cape Canaveral, we get a handful of change orders," says a contractor.

Contractors know they can't stop the flow of change orders, but they'd like to reduce the flow. They suggest that they be allowed to propose alternate methods of accomplishing the same end or that the Corps of Engineer officers in charge get authority to do this.

• **Let's have fewer bosses**—The base builders want to answer to the agency that hired them, the Corps of Engineers. They complain that the Air Force is looking over the Engineers' shoulders and kibitzing during construction. Before recent reorganization by the Pentagon it wasn't unusual for work to be inspected by the Corps of Engineers, the Air Force Civil Engineering Directorate, the AF equipment contractor, the AF missile contractor and the AF Ballistic Missile Division.

"The contractors and the government are trying to do the sort of thing they had to do in World War II," says an executive of a company with a base contract. "They're trying to do something they've never done before with new techniques, new products and new types of construction."

General feeling among contractors is that basebuilding should be put on a hot war basis if we're going to survive in the cold war. This means giving the builder more free rein in procurement, giving the contracting officer enough staff to check estimates on change orders immediately instead of waiting for word from higher echelons.

• **Let builders do the buying**—The contractors oppose the government policy on procurement of equipment. They claim that a contractor has more control over his vendor than the government has over its supplier, that the present practice causes many expensive delays to the contractors and to the government.

If the contractor does his own procurement, they say, he can spread the manufacturing load over a number of suppliers. This would keep manufacturers from becoming over-extended and make for more dependable deliveries.

This method would place the responsibility for obtaining the material and equipment in the hands of the man who is responsible for scheduling.

(Turn the page)

What builders say about missile base construction . . .

"The magnitude and frequency of the changes have far exceeded the most fertile of all imaginations. The frequency causes almost daily rescheduling of work forces, the magnitude severely taxes procurement staffs."

"There must be no division between the general construction work and the mechanical construction work into two or more prime contracts. This would only further complicate the joint occupancy problem on these sites and would be more expensive."

"Labor must come to a realization that by serving the interest of the country it can best serve the interests of its members. There have been too many petty jurisdictional disputes betwen the craft unions."

"A philosophy of business as usual or procedures per the manual just won't get the job done."

"The role of the Corps of Engineers must be clearly defined. We need a Contracting Officer on site who has technical ability to make decisions; the courage and staff to back them."

"There have been several instances in this program where it is obvious that the lowest bidder was out of his element and, therefore, not qualified to do the work. This has been one of the chief causes of publicity about the 'so called' lag in building."

"Contract administration has not taken advantage of wartime emergency power. The documentation required with every contract change is staggering. There is no time today to go to the usual 'three or more sources' for every door knob or nut and bolt."

"In several areas of our government, and also our press, there is the belief that contractors are taking this work with the idea of making exceptional profits on the changes to the contract. Nothing is farther from the truth."

"Enormous quantities of time are lost in obtaining approval of shop drawings when the A-E, Corps of Engineers, contractors' representative, and a representative of the vendor or subcontractor, all attempt to handle them in the normal business fashion."

(Story starts on p. 21)

• **Keep authority close by**—ICBM base builders say there is too much distance between the jobsite authority and the architect-engineer. With a representative of the A-E on the construction site with authority to make decisions on meeting changes in design and construction and to give early approval to shop drawings and specifications, much time could be saved.

They offer as another reason for delays the necessity of the Corps of Engineers project officer to get the approval of several higher echelons before he can act. The contractors propose that he get broader orders and discretionary powers.

The Corps of Engineers officer in charge of construction should have authority to order acceleration in the program when change orders are introduced, because he is in a position to recognize the need for it and the costs it involves.

A few contractors say that inadequate plans and specifications are causing them to lose time and money. To remedy this they advise hiring an independent expert to review plans and specifications prior to advertising and after award of the contract. So far, some of the construction contractors have had to enlarge their engineering staffs to avoid delays.

• **Prequalify bidders**—Contractors are almost unanimous in proposing tougher bidding qualification standards. They say that some companies with contracts aren't big enough to handle them and that others take on the jobs with less than the best of intentions.

One example cited was a contractor who bid $10 million on an ICBM site that Air Force estimated would cost $18 million. Three separate appraisals after the contract was awarded showed that material costs alone would run to $15 million, says ENR's source. The contractor submitted the ridiculously low bid, it is claimed, to get the contract at a loss and planned to make a profit out of change orders he knew would come by magnifying their importance in time and money.

• **Speed up payments**—Another subject on which most of the base builders agree is the slowness of government payment. They say this makes it necessary for construction contractors to invest inordinate amounts of their own funds in projects. This often works a hardship on a contractor's credit standing, his ability to contract more work and obtain sure bond coverage, and his ability to deal with his subcontractors and vendors.

A popular solution to this would be that two-part contract modifications or other extraordinary contracting authority powers be exercised to permit rapid payments on work performed and on work added to the contract by modifications.

As could be expected, most of the construction men were firmly opposed to allowing missile manufacturers to do construction work. Said one executive: "The result of both missile manufacturers and general or specialty contractors operating simultaneously on the same base is devastating."

Much of the blame for delays in the missile base program is attributed to squabbles by labor unions over which has jurisdiction over what work. These disputes should be settled by union machinery that is set up to handle them, instead of by strike, say the men answering Secretary Gates request for information.

East River Tunnel Is Holed Through

Another milestone has been reached in New York City's giant Newtown Creek Pollution Control Project with the holing-through of an 8,047-ft force main tunnel under the East River.

Hard rock tunnelers starting from the Brooklyn site of the future Newtown Creek Sewage Treatment Plant blasted through granite gneiss and schist some 300 ft below the river to complete the rough bore. They worked exclusively from the Brooklyn uptake shaft to complete the single heading, one of the longest on record in the New York City area.

The 8-ft 6-in., concrete-lined sewage tunnel will ultimately convey sewage from lower Manhattan Island to the treatment plant in the Greenpoint section of Brooklyn.

The downtake shaft in Manhattan was sunk through soil waterproofed and stabilized by freezing to avoid working under compressed air (ENR Sept. 3, 1959, p. 25). Conventional excavation and dewatering by pumping was ruled out because nearby apartment buildings built on piles might be affected by any change in watertable.

Basically, it was these pumping restrictions that dictated the single heading from the Greenpoint uptake shaft. This shaft was sunk deep enough to produce a 30-ft tunnel gradient that conveniently would bring any water encountered to the Brooklyn shaft where five electric pumps dewatered the shaft. With air-conditioned New York's occasional summer power blackouts in mind, the contractor installed a 5-in. diesel-powered standby pump at shaft bottom complete with exhaust scrubber.

The work shaft in Brooklyn is located on the site of the future treatment plant and the one-time Whale Creek Canal. The old canal was filled in somewhat haphazardly and on sinking the 13-ft shaft—the first 60 ft lined with sheet-piles, the remainder with tunnel iron—Poirier & McLane Corp., the contractor, encountered a discarded truckload of leather hides that defied excavation until jack-hammer spades were honed to knife edges and the skins literally clawed apart.

A rail-mounted jumbo with five drills averaged 6.7 ft of advance per shot. An average of 27 cu yd of muck per shot was produced using eight pounds of powder per cu yd of muck. Although this ratio is considered slightly high, the good quality of the rock encountered justified bigger charges that resulted in fast mucking operations.

On the plus side, the hard gneiss and schist is expected to save the city a sizable sum, since very little tunnel iron was used and roof bolting was held to a minimum. This saving may run as high as $500,000.

An 11-in.-thick non-reinforced concrete lining will be placed in the 11-ft-6-in. rough bore to produce an 8-ft 6-in. finish diameter. The intake shaft in Manhattan, which ultimately will handle up to 170 mgd of raw sewage, is also 8-ft 6-in. in diameter. The uptake shaft, now a 13-ft-dia work shaft, will get a reinforced concrete lining with a finish diameter of 7 ft 6 in. This reduction in the force main's diameter is designed to increase velocity.

Truck-mixed concrete will be supplied to the tunnel lining crews through a 10-in. drop pipe 375 ft ahead of the Brooklyn work shaft. Collapsible steel forms will be used in the lining process.

Ventilation is supplied by a 125-hp centrifugal fan that feeds 10,000 cfm through a 26-in. steel pipe. Poirier & McLane kept the ventilation pipe as close to the heading as possible to speed exhaust and cut lost time after a shot. While boasting of their "close-in" ventilating practices—24 to 50 ft from the headings—engineers noted that only two sections of the more than 8,000 ft of pipe were damaged badly.

Resident engineer for New York City's Department of Public Works is Henry G. Vermont. Poirier & McLane's project manager is John Decker; Andy Amisano is general superintendent; and U. S. Zanetti is engineer in charge.

The $130-million Newtown Creek project is a major phase of DPW's $420-million pollution control program. Construction of the 310-mgd treatment plant will start by 1962.

. . . Fun and Games for Tunnelers

Competition was rough and every one moved fast including the spectators at Poirier & McLane's holing through celebration. The crew above is racing the clock trying to drill through the boulder (foreground), change drill steel, go through again and then drive spikes in a simulated stretch of mine car railroad.

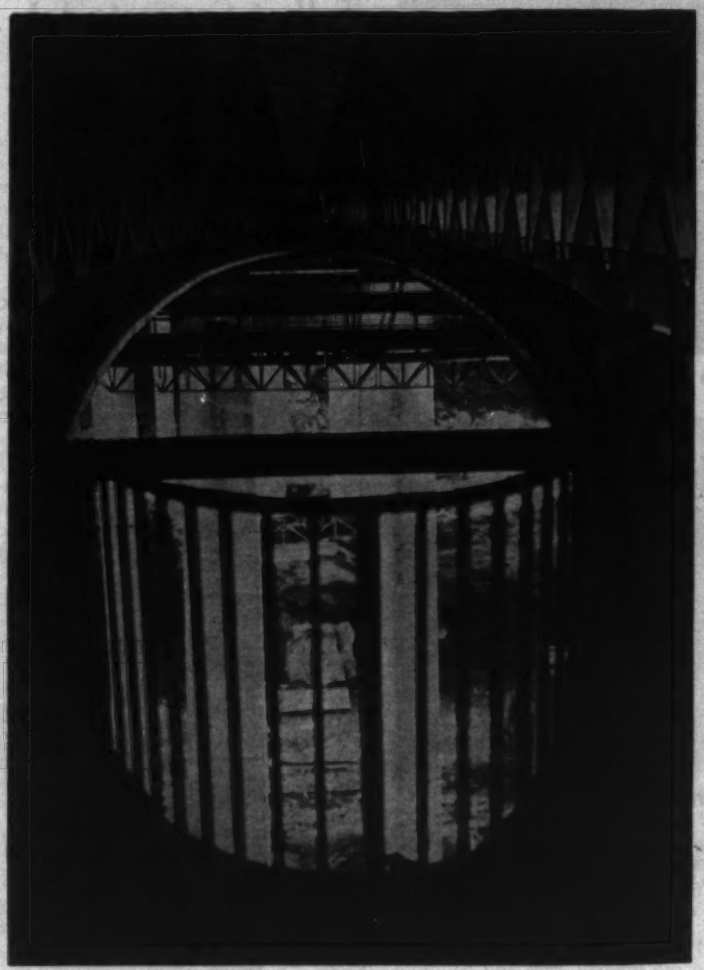
The contractor staged the competitive events as a new twist to the traditional holing through party. As the men demonstrated their skills to the satisfaction of many "surface lubbers," everyone got into the act, including general superintendent Andy Amisano (dark shirt), who got well doused when one team's water line let go. Winning time was 7 min 58 sec logged by the first team to enter.

Soviets Push Construction of Kama River Hydro

USSR dambuilders are trying to beat the construction schedule on the Votkinskaya hydroelectric project, located on the Kama River about 650 miles east of Moscow. They expect to put the first two generating units on line in 1961, a year ahead of schedule. Work this year is centered on the powerhouse, which will eventually produce 400,000 kw.

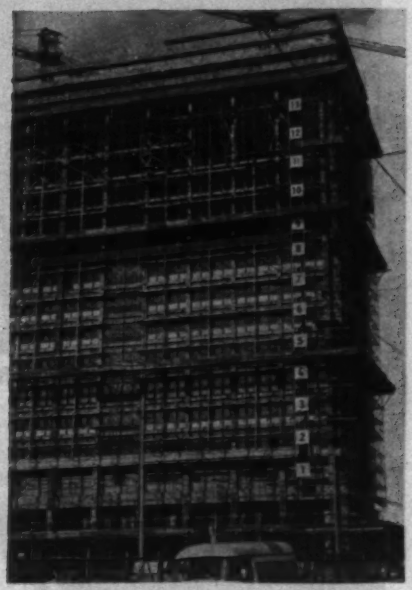
Through Grand Central

Thomas Crimmins Contracting Co. is ripping holes in the station platforms of Grand Central Terminal in New York City to reach bedrock. The company started work last week on the foundations for the 59-story Grand Central City office building, under a subcontract let by Diesel Construction Co., general contractor. Foundations will rest on rock 5 to 6 ft below the tracks.



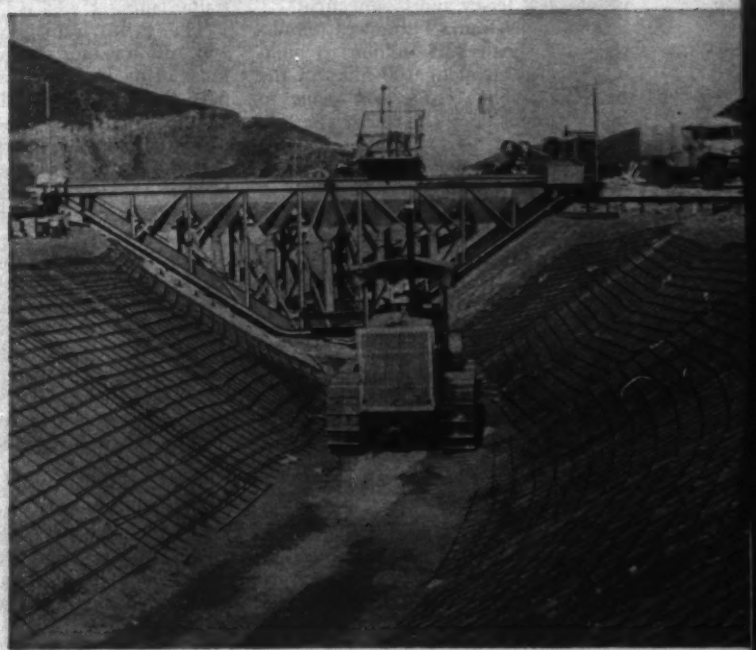
Built-in Bridge Balcony

The balcony-like picture is actually the lower level of a new double-deck bridge across the Mangfall Valley in West Germany, about 30 miles from Munich. The opening lightens the bridge, provides view for pedestrians and cyclists. Truck and automobile traffic uses the upper level.



Number Please?

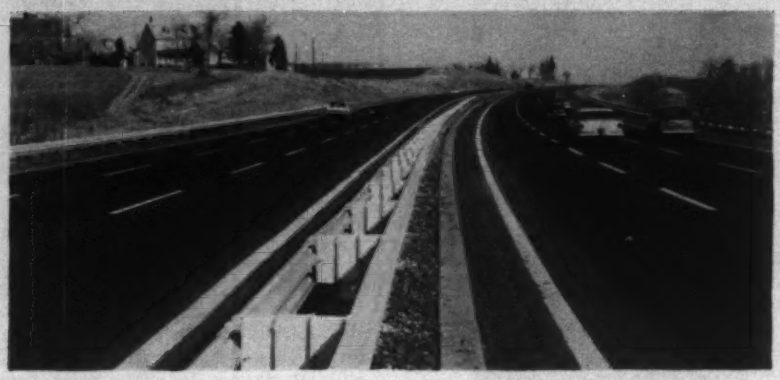
Large numbers mark the floors of a new office building in Hamburg, Germany. The numbers attached to the outside wall help crane operators direct their loads to the right floor without starting to count floors from the ground each time.



Canal for Jordan Water

Ninety miles of open channel and pipeline under construction by Israeli builders will carry Jordan River water from the Sea of Galilee to irrigate the dry coastal plains near Tel Aviv. The aqueduct will eventually be extended another 37 miles south from Tel Aviv to irrigate areas of the Negev Desert.

Connecticut experiments with a flexible median barrier and . . .



New Jersey and Pennsylvania build more rail barriers to . . .

Reduce Cross-Median Accidents

A recent outbreak of fatal cross-median accidents has stimulated plans for more than $13 million worth of median barrier construction in Pennsylvania, New Jersey and Connecticut.

The Pennsylvania Turnpike Commission will spend $2.5 million to build median barriers along 100 miles of the turnpike. The commission plans to build barriers along the rest of the toll-road next year.

The entire project will cost from $7 million to $10 million.

The New Jersey Turnpike Authority is spending $3.5 million for steel or aluminum median barriers and the New Jersey State Highway Department, convinced of the need for barriers, will build them on heavily traveled highways throughout the state.

Connecticut is experimenting with a flexible median barrier, chain link reinforced with three steel cables, along a 1,500-ft stretch of the Merritt Parkway that has had the state's greatest incidence of cross-median accidents, many of them fatal.

The Delaware Highway Department, although not convinced of the need of barriers on its divided highways, is interested in the kind of flexible barrier that is now being tested in Connecticut.

The median barriers are designed to prevent out-of-control vehicles from crossing the median strip and colliding with on-coming vehicles in the opposing traffic lanes.

The Pennsylvania Turnpike agency will call for bids August 30 for 100 miles of median guard rail. Contractors have the option of bidding on steel or aluminum railing.

By the middle of next year the New Jersey Turnpike is scheduled to have barriers the length of its center strip from the Delaware River to the George Washington Bridge over the Hudson. Barriers on bridges along the tollroad will be concrete.

Connecticut is using a flexible barrier composed of a chain link fence 4 ft high backed up by a ¾-in cable 9 in. above the ground and twin cables 30 in. above the ground. The state hopes this type of barrier will be resilient enough to absorb the impact of a vehicle hitting it.

Along three western sections of the Connecticut Turnpike, in the Stamford, Darien and Norwalk area, the department will install more than five miles of steel rail-type median barrier. Cost of these alterations will be about $133,000.

Tallest Concrete Job

New York hotel to set new U. S. mark

The newest hotel project proposed for New York City will be the tallest reinforced concrete structure in the U. S. The Americana Hotel, to be located on Manhattan's West Side, will rise a record 420 ft above ground level. It's scheduled to begin this fall.

The tallest reinforced concrete structure in this country to date is Executive House, a 365-ft-high apartment house in Chicago. The world's tallest is the 507-ft-high Sao Paulo Bank Building.

The Americana will have a 46-story and a 24-story wing. Vertical load and wind stress in the taller structure will be carried in large part by 8-in. to 12-in.-wide shear walls located on the lower 30 floors. No shear walls will be needed in the shorter wing, according to the engineers.

Columns in both towers will be about 18 in. wide and 30, 40 or 48 in. deep. Below the fourth floor, the engineers plan to use 24 x 30 in. composite columns with structural steel cores, to accommodate the required clear spans. Columns will be spaced about 24 ft c-c along the length of the building. There will be four rows of columns in each bent along the 56-ft-6-in. width. All slabs will be of beamless construction.

Lightweight 4,000-psi concrete will be used for columns, and 3,500-psi concrete is specified for floor slabs.

Floor-to-floor height of rooms will be 9 ft. Floor slabs will be about 7½ in. thick.

Reasons for the selection of reinforced concrete construction:

- Estimates showed that reinforced concrete construction will be more economical than steel framing, and permit a faster construction start.
- Reinforced concrete makes a more rigid building; deflections are estimated to be less than half what they would be with a comparable steel frame.
- Slab construction meets the architectural requirements of an unbroken flat ceiling with plaster finish.

The hotel will have 56 rooms per floor and about 2,000 rooms in all. Two floor levels below grade will be used for garages, lockers, service areas and an exhibition hall. Exterior wall construction for the 46-story wing will be glazed brick spandrels interspersed with continuous glass strips. The facade for the shorter wing is not yet set.

Architects for the hotel are Morris Lapidus, Kornblath, Harle and Liebman. Structural engineers are Farkas and Barron. The contractor is Diesel Construction Co. All are from New York City. Loew's Theatres, Inc., is owner.

LET'S TALK TURKEY

and clear up some facts about MASONRY SAWS

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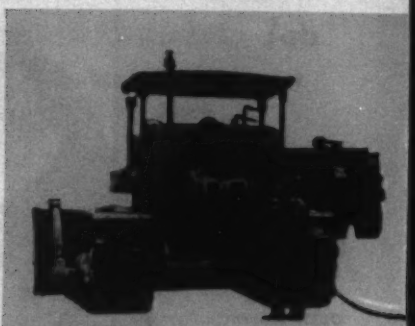

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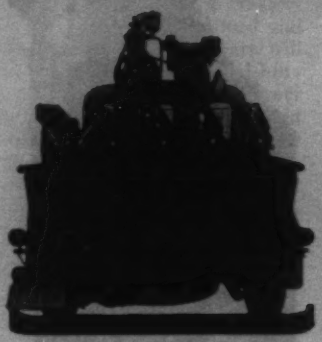

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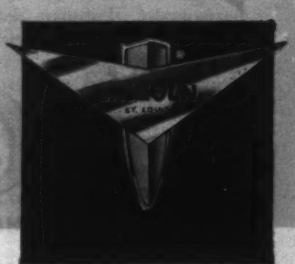
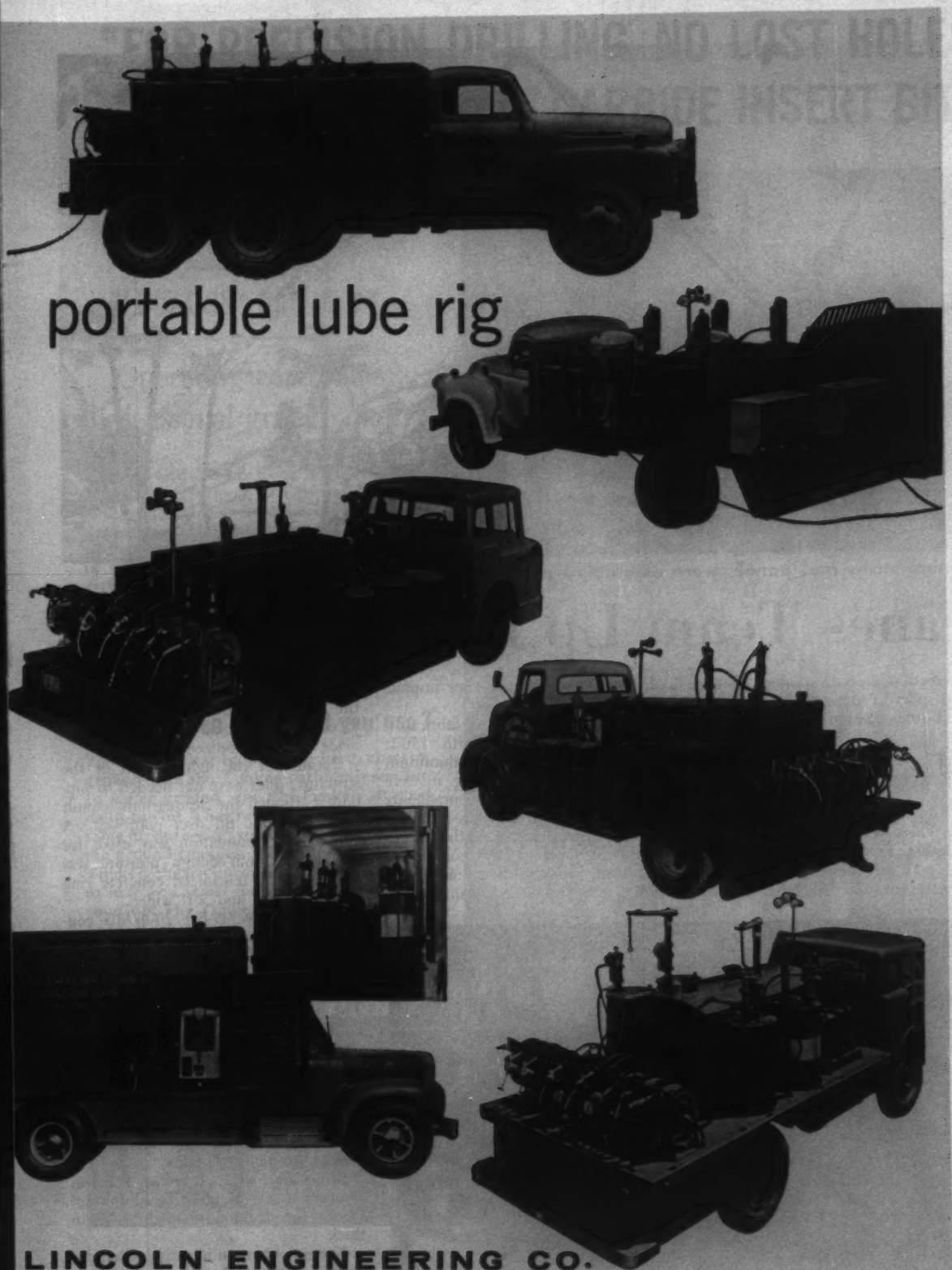


For more details write for Catalog No. 32 and Engineering Manual No. 33.

*Trade name registered



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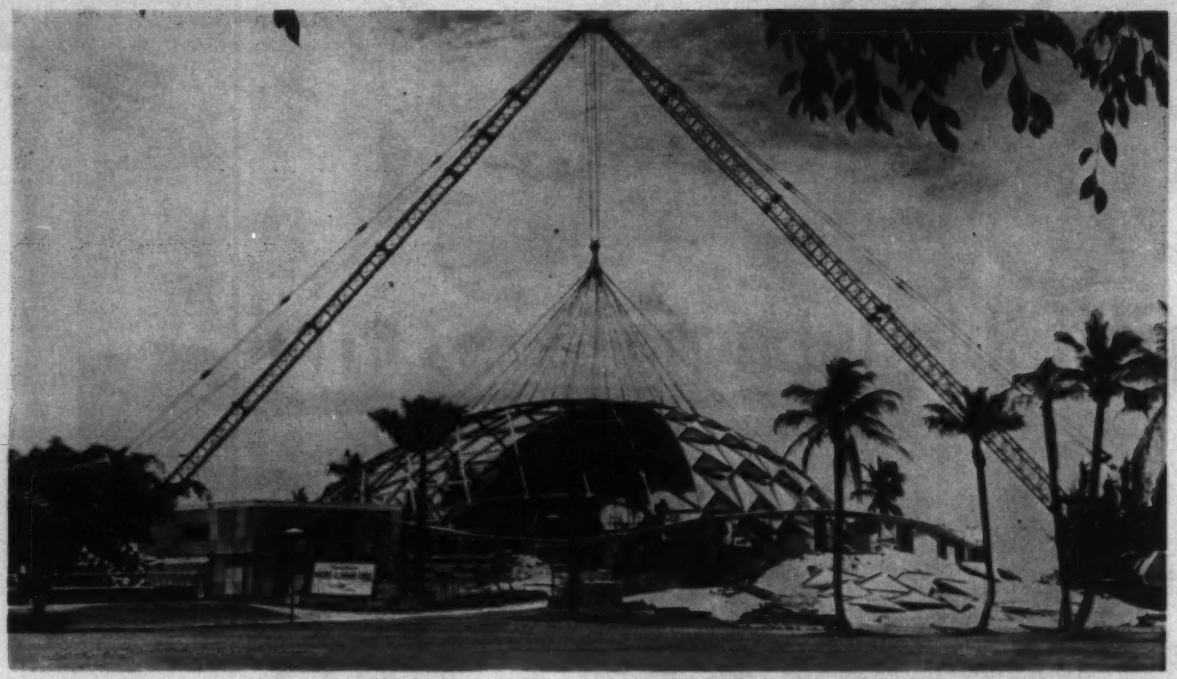

Aluminum struts and panels were assembled at grade and raised as the dome grew.

Cranes Team Up to Erect Dome

The erection procedure adopted for a trussed spherical dome built over the Miami (Florida) Seaquarium is a new twist.

This type of dome, 145 ft in diameter, usually has been erected on scaffolding, a central mast, a jacked-up central support or a gradually inflated balloon. These techniques couldn't be used because the Seaquarium had a porpoise pool in the center and an amphitheater at one side that made falsework of these other types impractical.

Instead, Domes, Inc., the fabricator-erector used two cranes with 150-ft booms to lift the dome as the aluminum struts and panels comprising it were assembled. The assembled components were kept suspended on lines radiating from a carriage slung from the cranes until the 23-ton dome was completed.

The major purpose of the $150,000 structure is to support a sunshade over the stands. Panels were omitted above the stage to allow light and breezes to enter. The dome and sunshade are made of gold-anodized aluminum.

Because of the light weight of the structure, piles were not needed to support it, though the Seaquarium is built on a hydraulic fill over poor soil. A floating-ring foundation was used, for which maximum design pressure was 500 psf. The reinforced concrete ring is 12 in. thick and 5 ft wide.

On it sit twenty-five 20-in.-dia concrete columns, extending 10 and 13 ft above grade. The tops are joined by a concrete beam that undulates because of the 3-ft difference in column heights. The beam is 9 in. thick and 4 ft wide. Dome shoes are anchored to it at the columns.

The dome, suspended from the cranes, was first attached to five equally spaced high points, to minimize bending stresses. Then it was connected to five low points. The intermediate support points fell into place.

Struts are comprised of two 4x2x¼-in. channels made of 6061-T6 aluminum. Panels are diamond-shaped, 0.08 in. thick.

Kaiser Aluminum and Chemical Sales Co. designed and supervised erection of the dome. Rader and Associates, Miami architects-engineers, were consultants on the design. Charles F. McKirahan, of Ft. Lauderdale, Fla., was the architect.

Giant sunshade of Miami Seaquarium is supported on the dome.

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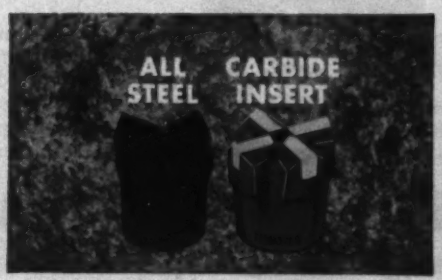

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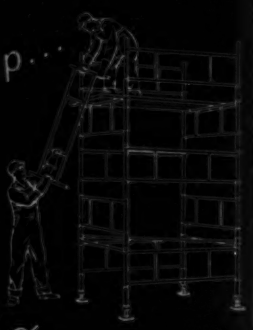

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Around the World

• **Power plant out for bids**—Bid invitations are out for the Bureau of Reclamation's 150,000-kw Spring Creek power plant in northern California. The indoor plant is part of the Central Valley Project and will house two generating units. Work includes a penstock valve structure, 600 ft of 21-ft-dia concrete-lined tailrace tunnel, and furnishing and installing penstocks. Bid opening is scheduled for September 15 in Lewiston, Calif.

• **Big money for Long Island**—A $25-million development containing office and apartment buildings will be built at Hempstead, N. Y. Max M. Simon, New York City architect, designed the project, to be known as Imperial Square. Sponsors are Samuel Bernstein & Sons, builders, and First Republic Associates.

• **Japan builds abroad**—Taisei Construction & Engineering Co. has signed a contract with the Bank of Indonesia to build an $8-million hotel in Djakarta. The 14-story, 443-room hotel is scheduled to be completed in time for the fourth Asia Olympic, to be held in the Indonesian capital in 1962.

• **Urban renewal, eastern style**—A four-year redevelopment program, estimated to cost $17 million, is now under way in Iraq. Completed: a water supply system, a low-cost housing project and a $5-million highway linking the cities of Darbala and Najaf. Now in progress: street-widening and mosque-building projects in Karbala.

• **Beaumont center**—An $8-million block-size development known as the American Center now is under construction in Beaumont, Tex. The center will comprise a 13-story office building and a five-story bank building. The two structures will be separated by a landscaped court, but connected by an enclosed arcade. Completion is scheduled for late 1961.

• **Big U. K. factory**—Foundation work has started on a $79-million Ford factory in England. Steel erection will begin next fall, and the plant should be in operation by late 1962, on completion of the first stage. Plant capacity will be 200,000 cars a year initially; later it will rise to 300,000.

• **Louisville rubber plant** — C. F. Braun & Co., Alhambra, Calif., will build a synthetic rubber plant at Louisville, Ky., for the American Rubber & Chemical Co. Construction on the $10-million to $15-million project will begin in September of this year. Target date for completion: September, 1961.

• **Concrete placement record**—Barnaby Concrete Corp. concreted 28 floor slabs in 30 working days for Tower Gardens—two 14-story apartment houses in New York City. Floors are about 8,300 sq ft each, require 205 cu yd of concrete. A total of 5,750 cu yd were placed in columns and slabs in the 30 days. One floor in each building was completed every other day. Gotham Construction Co., New York City, is the general contractor.

Marsh Reclaimers Become Official

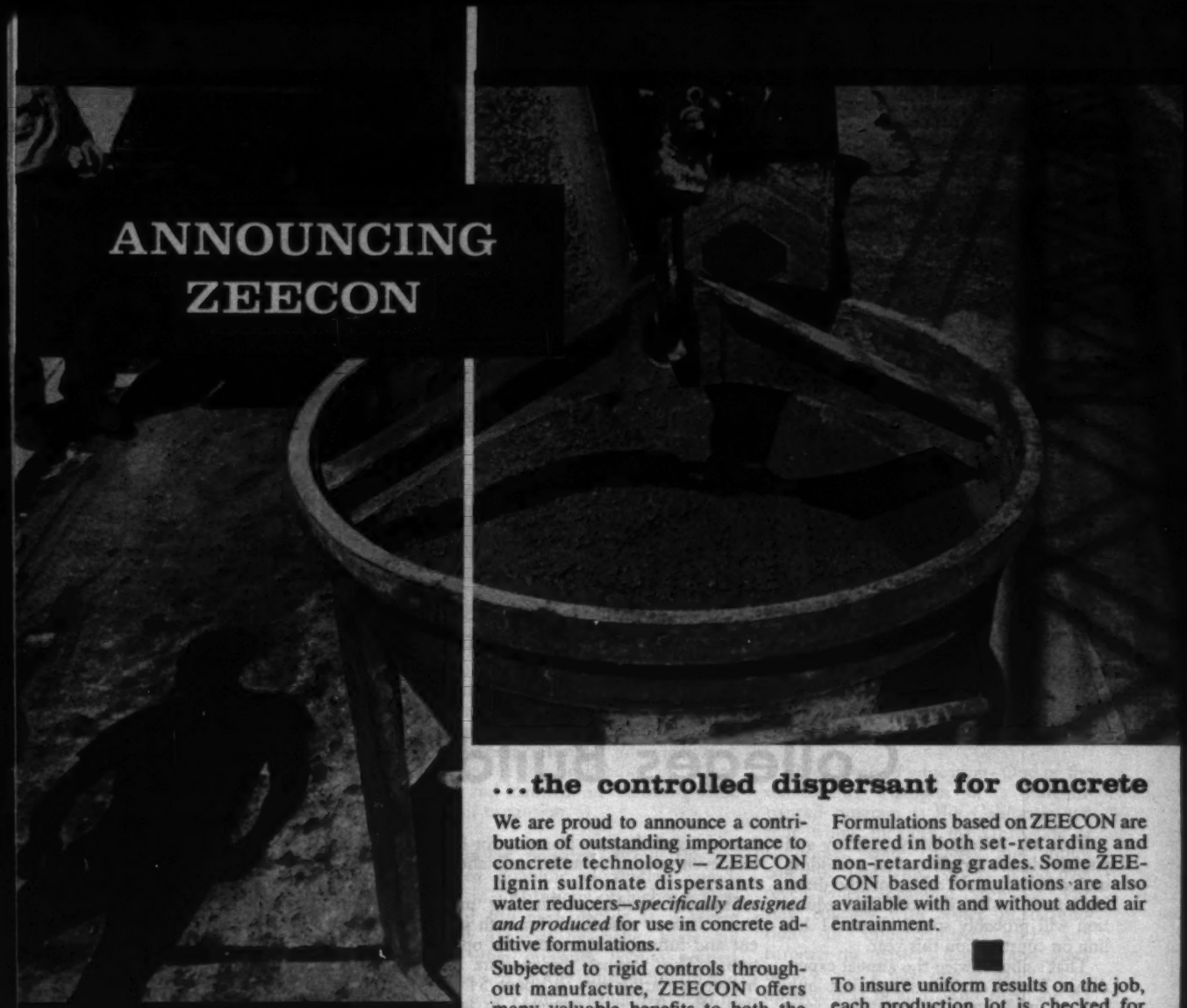
Official sanction has been given to a group charged with reclamation and development of 14,500 acres of New Jersey marshland in the shadow of the Empire State Building. Ordinances passed by 10 municipalities in the vicinity of the Hackensack and Passaic rivers give the group, the Meadowlands Regional Development and Planning Agency, its new status.

The development agency would acquire lands and buildings by condemnation, borrow money and issue bonds to finance reclamation projects and contract with public agencies or redevelopers.

As envisioned by the State Department of Conservation and Economic Development, the agency would ultimately consist of two commissioners from each of 13 municipalities, one additional member from the community with the largest population and a representative appointed by the state commissioner.

Work of the group would be apportioned among a finance and fiscal committee, an administrative and legal committee, an engineering committee and a committee on planning and land use.

Private owners, represented by the Meadowlands Owners Association, have also announced their intention of reclaiming about 6,000 acres of land with an estimated value of $38 million.



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ENR REPORT: COLLEGE CONSTRUCTION-1

Colleges Build Now for the

Visit any college in the country and you are almost certain to find a building under construction; others on the drawing board. Institutions of higher education will probably spend about $1 billion on construction this year.

That's about twice the annual expenditure five or six years ago—but only half of what may be spent ten years from now. The total to be disbursed on construction over the next decade is estimated by various authorities at between $9 billion and $15 billion.

While nearly every institution of higher education will be doing some building, the amount of money that will be spent and the type of facilities that will be constructed vary considerably. Faced with the necessity of expanding or bursting at the seams, some colleges are merely adapting to their needs structures built for other purposes; others are off on a new-building binge (one university is building at the rate of $1 million per month and expects to continue at that rate for about 13 years). Some institutions are concentrating on residential facilities; others are adding classrooms, libraries, research centers.

In general, construction now under way is aimed at meeting much more than current needs. College officials are aware of great new pressures for expansion, and they are planning for five, ten, even twenty or more years ahead.

• **Financial headaches**—The big problem is how to raise funds for both present and future construction and operation. The annual expenditure on higher education now is about $4 billion. By 1970 it is expected to jump to more than $10 billion. Yet nearly all colleges even now are having difficulty meeting expenses, despite the fact that faculties are grossly underpaid.

Considerable study, therefore, is being given to this problem of financing higher education while it is being rapidly expanded.

No single formula for solving it has been found and none seems possible, in view of the wide variety of institutions and their different needs.

There are in the U. S. about 2,000 universities, liberal arts colleges, teachers colleges, engineering institutes, theological and professional schools, and junior colleges. About 60% are public and 40% private. (Some authorities believe that this ratio will change to 80:20 in about ten years if tuition fees for private institutions continue to climb at a faster rate than those for public.) And some institutions are primarily residential, others entirely commuting. These differences affect sources of income. They also affect the type and size of building programs.

The U. S. Office of Education estimates that enrollments in institutions of higher learning may rise from 3.5 million in 1958-59 to about 6.4 million in 1970. Many authorities consider that estimate too conservative, but whether it is or not, colleges and universities will have to build at a fast pace just to keep up.

• **Mechanization of teaching**—Another critical problem arises from the fact that the supply of good teachers cannot be expanded rapidly. One possible solution is an increase in teacher productivity, which could be brought about by improving teaching and learning patterns and eliminating unessential courses. An additional possibility is an increase in the number of classes per year—day and night sessions, trimesters instead of semesters.

If such changes are made, the effects will be reflected in the design of college buildings. The interiors will have to accommodate very large, as well as very small classes; they will have to permit use of visual aids and mechanical devices to speed learning; and they will have to allow comfortable year 'round occupancy.

The necessity for conducting research

Future

WHAT YOU WILL FIND IN THIS REPORT

1. **Colleges Build Now for the Future** *p. 34*
2. **Planning a Campus Today for Tomorrow's Needs** *p. 40*
3. **They Are Changing Classrooms, Lecture Halls, Libraries** *p. 46*
4. **College Research Facilities Are Getting More Complex** *p. 54*
5. **Economics Are Shaping the Dormitories** *p. 58*
6. **Roofed Athletic Centers Are Getting Bigger** *p. 62*

at the college level is also adding financial burdens to the institutions of higher education. Universities, of course, finance research done on their own account, but they also frequently contribute to the costs of research done for an outside sponsor. Last year, universities contributed $95 million to government-sponsored research and $30 million to other sponsored investigations.

• **Government's role**—Though federal contributions to college research may be too meager, the government is assisting these institutions in at least three other ways—through a program for disposal of surplus property, by guaranteed loans and by urban renewal.

The first has provided land, buildings and equipment, especially in the immediate postwar years. The loan program authorizes 50-year loans at favorable rates for such revenue-producing buildings as dormitories, dining halls and student centers. (Since 1951, loans totaling nearly $750 million to more than 500 institutions of higher education have been approved.)

Urban renewal has made available land for expansion at low cost and permitted improvements in campus environments.

The states also have been making substantial contributions to higher education and may be called upon in the next decade to pay a much greater share.

"The trend in recent years," says Robert D. Calkins, president, Brookings Institution, "has been toward a growing dependence of both public and private institutions on public funds. In 1955-56 government provided nearly half of the $560 million received for buildings and facilities in public institutions and contributed $9 million for such purposes in private institutions. It also provided about one-third the loan funds borrowed for physical facilities . . .

". . . The state and local burden may be expected to expand over the next decade to about $4.3 billion by 1969-70 ($3.8 billion for education and $0.5 billion for plant)." (In 1957-58, state and local support came to about $1.6 billion.) These estimates are predicated, in part, on the availability of federal grants and loans for an increasing share of plant expansion.

• **Expansion pressures**—While the anticipated doubling of student enrollments in institutions of higher education in the next decade is a severe enough financial headache, there are many other pressures behind present and planned college construction to add to the pain. These include the need to modernize facilities, teach new subjects, carry out research in new fields, correct inadequacy of existing location due to changing environment, consolidate spread-out facilities and accommodate interdisciplinary activities.

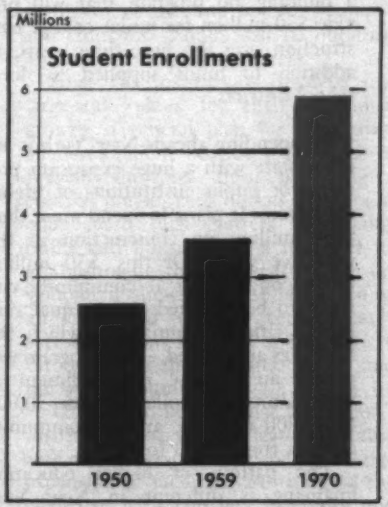
The reactions of individual institutions to these pressures depend, in turn, on a wide variety of factors—whether they are public or private, large or small, old or new, progressive or traditional, growth-minded or stable, potentially rich or poor, residential or commuting.

• **Enrollments spur growth**—Publicly supported institutions in some states, for example, may be required to admit all high school graduates who apply. Those colleges have been under pressure to expand because of increased enrollments for more than a decade.

Consider Kent State University at Kent, Ohio, which had an enrollment of about 8,000 in 1959-60. It has experienced a 50% increase in students every two years. Its biggest bottleneck is residential facilities. It now houses less than half its students. Kent plans to spend $17 million between now and 1966, principally to remedy this deficiency. But it can't build too far in advance because it is restricted by biennial legislative appropriations.

On the other hand, Ohio State University at Columbus with an enrollment of 22,000 has engaged a firm of architects to plan its campus for 20 years in the future. At that time the university is expected to have an enrollment of about 50,000. While the study is being made, the university will be spending $5 million to $6 million per year, at least until 1965, for land purchases, remodeling, additions to existing structures and a few new buildings.

• **Three levels of education**—One of the outstanding examples of a state-financed program is the California system, which includes the University of California, state colleges and junior colleges. The University is spread over seven widely separated campuses. The state colleges, with rather broad functions in undergraduate work and through the master's degree, now number 14, and a new one is slated to be opened next month. And there are 63 junior colleges, which offer instruction through the 14th grade. Present plans



ENROLLMENTS may double by 1970.

. . . Rising enrollments spur expansion

are to have each school district served by a junior college, supported by the district through local taxes, but with the state contributing 30 to 40% of operating costs.

This scheme is putting all segments of the public system of higher education under great pressure to expand to meet the growth in student enrollments. This fall over 300,000 will be attending the public institutions (at the University, 50,000; state colleges, 68,000; junior colleges, 188,000).

The enrollment at the University this fall will be about one-third larger than it was in 1955, and it is expected to increase about 50% more over the next five years. To meet its greatest needs, the University has budgeted about $215 million for expenditure by 1965 on "major capital outlay projects." But the rates of growth of present and proposed campuses will be regulated to preserve academic quality, and in the next five years some 11,000 students will be diverted to junior colleges during their first two years. The University may limit admission only to students ranking in the top eighth of high school graduates.

Enrollment in the state colleges this fall will be up more than 50% over what it was five years ago. And it is expected to double in the next five or six years. This estimate has led the state colleges to budget about $165 million for major capital outlay projects between now and 1965. The state colleges also will tighten admission standards, perhaps admit students only in the top third of high school graduates.

As a result, enrollment in junior colleges also will increase rapidly—probably 50% or more in the next five years. The state legislature is studying a building aid program that will provide $30 million for junior college construction over the next three years, in addition to funds supplied by local school districts.

• **Big spending ahead**—New York is another state with a huge expansion program for public institutions of higher education. It plans to spend more than $350 million on construction in the next five years. Of this, $50 million is for construction at community colleges, to be matched by an equal sum by the cities or counties in which the buildings are located. This program will permit an increase in enrollment at State University colleges from 30,000 to 43,000 in 1965, and at community colleges from 9,000 to 30,000.

The pattern of higher education financing is different in New York from that in California and other western states. In New York, two-thirds of the undergraduate students study in private institutions, compared with less than one-quarter in California.

TEACHERS' ROLE is changing.

In contrast, Florida, where the pressure for expansion is just as great, has a much more modest program. About 28,000 students will be enrolled this fall under the university system of the Florida Board of Control. This is an increase of one-third over the enrollment in 1955, and the enrollment is expected to be 50% larger in 1965, more than 100% greater in 1970. In addition, 25,000 are expected to be enrolled in the public community college system in 1965 and 35,000 in 1970.

The Board of Control anticipates spending $70 million on construction in the next five years and an additional $100 million in the following five years. These estimates include funds for the air-conditioned University of South Florida, now under construction at Tampa, and proposed universities at Boca Raton and Pensacola.

The University of Wisconsin, with campuses at Madison and Milwaukee, is fortunate in that it has three means of financing its expansion. Hence, it is not too dependent on the basic one that is so crucial in Florida—appropriations by the state legislature. The university borrows money for self-amortizing projects, such as athletic facilities, dormitories and student unions, through its own building corporation, pledging income to retirement of loans. It also obtains capital through appropriations from a State Agencies Building Corp., which issues bonds and has set up an amortization program.

The University of Wisconsin has to expand not only to keep pace with an enrollment jump but also to catch up with a backlog of needed construction. It has set up a $138 million six-year building priority program.

Student housing is the biggest problem. But the shifting of emphasis from one educational program to another is another major reason more facilities are needed.

• **Expanding to improve**—Meanwhile, private institutions of higher education, generally motivated by the need to maintain or improve quality of instruction, to teach new subjects and to do more research, have also been raising large sums for expansion. These funds are being contributed principally by alumni, industry and philanthropic foundations and individuals. Contributions from the federal government are principally for research. And some private colleges rely solely on tuition fees for income.

Since alumni contribute a considerable portion of the expansion funds of private institutions, the newer colleges and universities have tougher sledding than the older ones, especially since other donors generally base their donations on what alumni give.

Brandeis University, on the outskirts of Boston, is one example of a new institution almost completely dependent on gifts from other sources than alumni. Its first class started in 1948. Now it has 1,300 undergraduates, 200 graduate students.

Though the university plans to limit undergraduate enrollment to a total of 1,500 (to be reached in 1964) even this modest growth of 200 in four years presents serious financial problems. Present income is $10 million per year, plus grants from industry and government for specific projects. The 1960-61 budget is $17 million. Problem: How to get unrestricted donations totaling at least $7 million per year.

At the opposite end of the spectrum, the older, larger universities have just as serious a fiancial problem because their expansion programs are much larger. Harvard University recently raised $38 million for Harvard College, primarily to improve faculty salaries. But in the last few years the college also has been adding to its plant at a rate of about $10 million to $15 million per year. At least $20 million is to be spent on construction in the next three years, the objective being more to catch up with needs than to expand (undergraduate enrollment at Harvard hovers around 4,500.)

This summer, the Harvard Medical School announced plans for a $50-million medical center. More than $3 million has been raised for a start this fall on two of the buildings. In the offing,

. . . Billion-dollar building boom gets rolling

is a proposed hospital complex, estimated at another $50 million.

Nearby Massachusetts Institute of Technology, despite a sizable construction program, also is limiting the number of students it will admit, to concentrate on quality. MIT plans to hold its undergraduate enrollment at about 6,300. It now also has about 2,700 graduate students.

But MIT faces critical problems in the use of land, as do many other urban institutions. For one thing, open-lot parking on the campus has become uneconomical; instead, MIT is erecting a series of self-amortizing multistory parking garages around the border of the campus. Land for buildings must also be used more intensively. Among nine buildings proposed for construction in the next ten years, at least four will be high-rise—up to 20 stories high.

In contrast with Harvard and MIT, Columbia University in New York City plans to increase its college enrollments as soon as it is physically possible—from 2,500 to 4,000. Columbia has an $80-million construction program under way, of which only about $31 million has been pledged so far. Priority is being given to new residential and laboratory facilities.

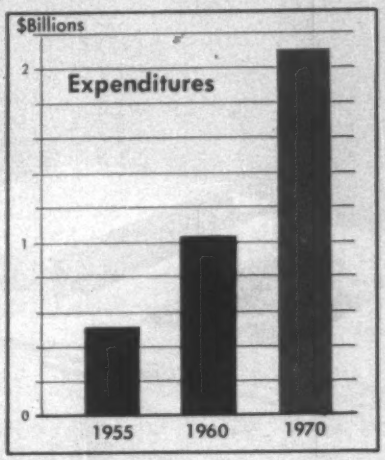
Princeton University has permitted slow growth of undergraduate enrollment—20% in 20 years—but plans to hold it steady at about 3,000. Graduate enrollment, at 800 in 1959-60, will be permitted to grow.

Princeton currently is engaged in a $53-million campaign to build new facilities on campus and "to add depth and strength to the teaching and research programs." Construction already has started on several buildings: five dormitories, a biological laboratory, an engineering quadrangle, an extension of the power plant and new buildings for architecture and music.

• **Move to the country**—New trends in education have stimulated much of the new building. Another important stimulant is the need to change or improve the location of a college, because of changes in the surrounding neighborhood or because necessary expansion has become too expensive.

For example, 95-year-old Rider College, primarily a business school, found itself throttled by its location in the center of Trenton, N. J. So the college bought 142 acres in rural Lawrenceville, on the outskirts of Trenton, and is building a new campus.

• **Help from urban renewal**—Many urban institutions, though similarly handicapped, feel a responsibility to remain in the downtown area to serve local students more conveniently. Some of these are finding considerable help in federal-city urban-renewal aid programs.



CONSTRUCTION may double by 1970.

Temple University, in the heart of Philadelphia, is one that decided to remain and expand at its present site. In 1950, it taught 10,000 students on a four-acre plot. This fall it will have an enrollment of 17,000 on a campus expanded to 40 acres with city aid. By 1965, the enrollment is expected to jump to 25,000, at which time another 100 acres will be needed.

Temple is spending $25 million on its current expansion. It expects to spend another $50 million over the next 15-year period.

The University of Chicago also could not move. In addition to its community responsibilities, it had too big an investment in plant—$210 million—to consider this alternative, though expansion was essential and slums had crept right up to the edge of the campus. Present undergraduate enrollment is 2,200, up 30% from what it was five years ago, but less than half of what it is expected to be in 1965.

To help itself and the community, the university tied its expansion plans in with urban renewal of the Hyde Park-Kenwood community adjoining its Midway campus on Chicago's south side. More than $131 million has been pledged in government and private funds for reconstructing the neighborhood. Of this, the federal government will put up $34.6 million and the city and state $14.6 million. Private sources will spend $81.6 million for new construction, rehabilitation of existing dwellings and expansion of institutions other than the university.

The university will spend $50 million on its expansion program over the next five years. It has put more than $38 million into construction on the campus over the past ten years.

Illinois Institute of Technology, also in a blighted Chicago area, is determined to stick it out, too. It expects to expand its campus from the present seven acres to 110 acres.

IIT is spending $60 million for 60 buildings, of which 40 are completed or under construction. About $27 million will be put into new construction in the next five or ten years.

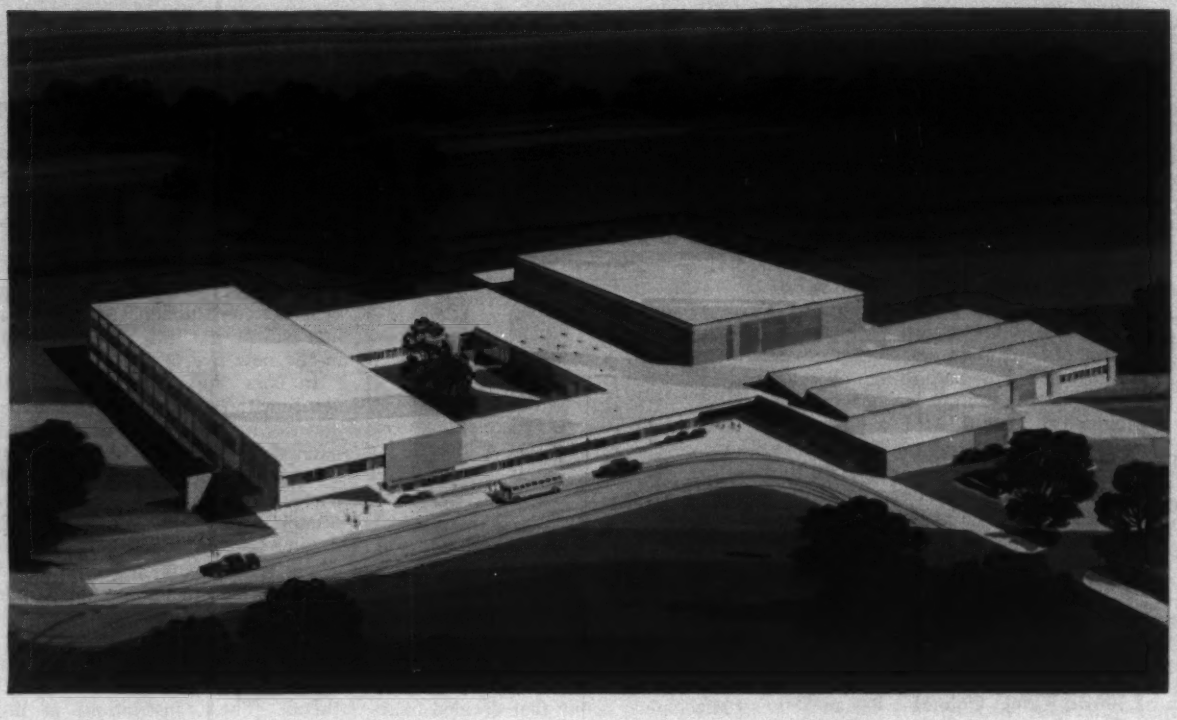
In New York City, Fordham University with its main campus away from downtown, is taking advantage of urban renewal to build a $25.5-million campus for 4,000 students in midtown Manhattan. The university's expansion will occupy a two-block site in the $205-million Lincoln Square project. It will adjoin the $75-million Performing Arts Center, which includes an opera house, concert hall, ballet theatre, school of music and repertory theater.

The University Circle Development in Cleveland is a variation on this theme. There, institutions of higher education are combining with cultural and artistic institutions to expand an existing cultural center with the aid of urban renewal. Existing institutions already have $125 million invested in plant at the site, four miles from downtown. Plans call for an expenditure of $175 million more to expand and rehabilitate the cultural center on 488 acres. A University Circle Foundation has been set up to guide and implement the development.

Of the more than 30 institutions expected to occupy the site, the largest are the existing Case Institute of Technology, Western Reserve University and University Hospitals. Other institutions involved include museums, institutes of art and music, hospitals and churches. Funds will be obtained primarily from private sources.

Since the institutions involved had large-scale plans for their individual growth, a general plan for their overall development became a necessity to prevent the area from becoming a cultural jungle, with dozens of them at odds about such matters as parking, traffic and housing. As a result of its establishment, the University Circle development shows promise of becoming an integrated cultural center, easily accessible from all parts of the city, to the benefit of the students, faculty and the whole community.

Thus it can be seen that the nation's institutions of higher learning, faced with the necessity of financing a huge expansion of facilities, are rising to the challenge with courage, ingenuity and imagination.



In the new Batavia Senior High School, Batavia, New York...

NEW CARRIER HEATING AND VENTILATING SYSTEM PROVIDES 9 MAJOR ADVANTAGES YET COSTS LESS

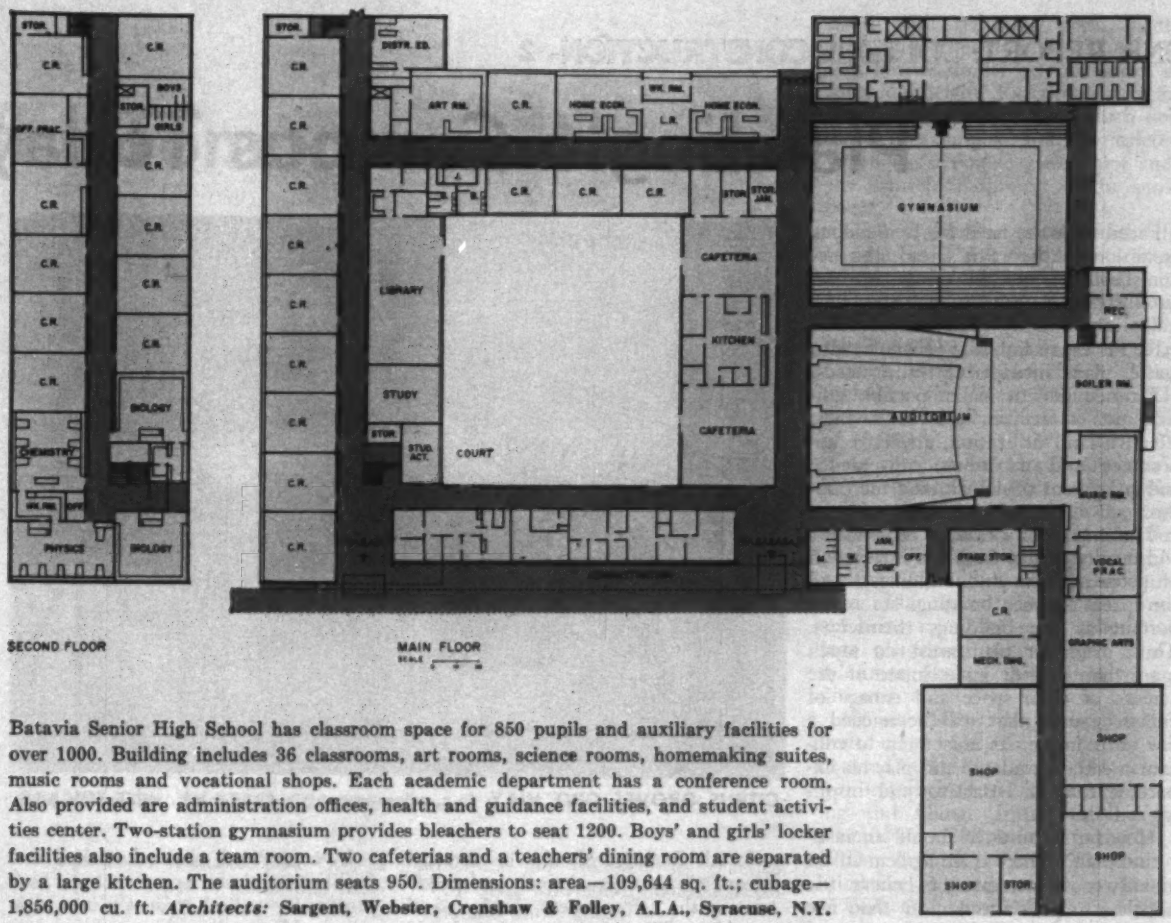
This modern high school offers an excellent example of how any new school can enjoy a superior heating and ventilating system at less than the cost of ordinary unit ventilators. And this new kind of system is ready for immediate conversion to year-round air conditioning with the simple addition of packaged refrigeration equipment in the machine room.

In planning Batavia Senior High, the architects considered unit ventilators and several popular central station systems. They carefully compared the performance characteristics, maintenance requirements, first cost and operating cost of each method. Their conclusion: The new Carrier 37E All-Air Weathermaster* System provides the highest quality automatic heating and ventilation currently available to schools. It is the easiest to convert to complete year-round air conditioning. It costs 10% less, installed, than the next best method. And it costs less to operate and to maintain than other automatic systems.

The nine important advantages of the 37E Weathermaster System which led to these conclusions are listed on the opposite page. They are unique because Carrier 37E units are the only room terminals which combine the performance benefits of the induction principle with either high or low velocity air distribution and the superiorities inherent in all central station systems.

If you are planning a new school, it should be well worth your while to look into the Carrier 37E All-Air Weathermaster System—either for heating and ventilation only, or with an eye to future air conditioning. The nearby Carrier office will be glad to give you, your architect and consulting engineer complete facts on the system. Or you may write to Carrier Air Conditioning Company, Syracuse 1, N. Y.

*Reg. U.S. Pat. Off.



Batavia Senior High School has classroom space for 850 pupils and auxiliary facilities for over 1000. Building includes 36 classrooms, art rooms, science rooms, homemaking suites, music rooms and vocational shops. Each academic department has a conference room. Also provided are administration offices, health and guidance facilities, and student activities center. Two-station gymnasium provides bleachers to seat 1200. Boys' and girls' locker facilities also include a team room. Two cafeterias and a teachers' dining room are separated by a large kitchen. The auditorium seats 950. Dimensions: area—109,644 sq. ft.; cubage—1,856,000 cu. ft. *Architects:* **Sargent, Webster, Crenshaw & Folley, A.I.A., Syracuse, N.Y.**

Only the Carrier 37E All-Air Weathermaster System offers these 9 advantages for heating and ventilating

1 Positive ventilation and air circulation under all conditions and seasons for improved odor dilution. Constant air volume from units.

2 Quieter operation—no fans or other moving equipment in classrooms, with all powered equipment located in machine room for easy servicing.

3 Superior air filtering at central station—minimum filter maintenance.

4 No costly wall openings, subject to rain and wind leakage, required in classrooms for ventilation air.

5 No operation of fans required for night and week-end heating, with gravity heating handling the load.

6 Individual temperature control in every room solves zoning problems; air damper assures easy initial system balancing, requires no adjustments thereafter.

7 Valuable classroom floor and wall space is saved by the compact units; cabinet only eight inches deep.

8 Remarkable new Carrier Air Purifier may be included in central system for automatic filtration, automatically regenerated odor absorber and winter humidification.

9 Easily and economically converts to full-year-round air conditioning at any future date with simple addition of packaged water chilling machine in central apparatus room. No revision of classroom units, controls or air ducts required. Condensate drains not needed. Nominal conversion cost about 65c per sq. ft., or less.

MORE PROOF OF
BETTER AIR CONDITIONING FOR EVERYBODY *EVERYWHERE*

Carrier

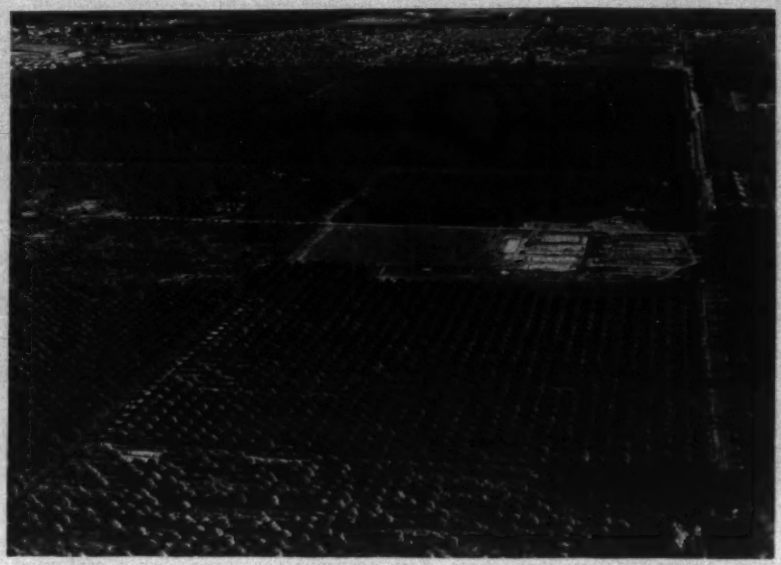
Planning a Campus Today

Faced with the need for tremendous expansion in the years ahead, the nation's colleges and universities are determined that growth shall be controlled and orderly. They endeavor to make the expansion, as it occurs, fit into master plans anticipating future needs.

Planned growth makes possible efficient use of facilities and cost savings, effective land utilization, attractive appearance and maximum convenience and enjoyment for all who use the campus.

The impact of a campus on students and faculty derives from the interaction of people, spaces and buildings. And the spaces between buildings are as important as the buildings themselves. Thus, a master plan must do much more than provide an estimate of the acreage of open space and cubage of enclosed space that will be needed a few years hence. It must help to educate and train students and play an important role in attracting and inspiring a faculty.

How far in advance should an institution plan? There is no agreement on an answer. Some educators believe it is hopeless to plan ahead more than five years. Others contend that a master plan should be set up for a 50- to 75-year period, perhaps broken down into three phases: (1) immediate needs; (2) remaining foreseeable needs; and (3) unknown needs. Furthermore, it should be subject to revision as the needs of the institution change. Planning should be a continuous process.



CITRUS GROVES GIVE WAY to a college campus in California as enrollments jump.

• **Basics of master planning**—Here are some fundamental principles to be observed in drawing up a master plan:

1. Land should be zoned for specific purposes and desirable density standards established for various areas. Facilities should be located so that those functionally linked are also linked physically. Separation of facilities should be small if there is substantial student traffic between them, if spontaneous contacts between faculty are vital, or if provision must be made for movement of supplies, special servicing and access for visitors. In addition, the plan should encourage development of new, desired linkages.

2. Land should be reserved both for inward and outward expansion. Each activity should be allowed room for its presently foreseen needs plus space for unpredictable future growth.

3. All facilities should be serviced adequately by internal roads and pedestrian paths (city streets eliminated if possible). The whole complex should be accessible by passenger cars, buses and, if possible, rapid transit or trains. Urban and campus traffic, pedestrian and vehicular traffic should be separated. An efficient distribution system directing traffic to its final destinations is essential.

4. Adequate parking facilities should be provided. Large, open parking areas should preferably be located at the fringe of the campus, where they can serve also as a cushion for future expansion. Internal parking should be provided only in small, intensive, controlled areas (parking ramps or underground garages).

5. Provision should be made for social and recreational needs of students, as well as for study and research.

6. The whole campus should be visually outstanding. Use should be made of such devices as dominant foci, ordered open spaces or continuous paths to unify the campus layout, without attempting to dictate the exact form of future parts, and without suppressing the identity of individual components of the campus.

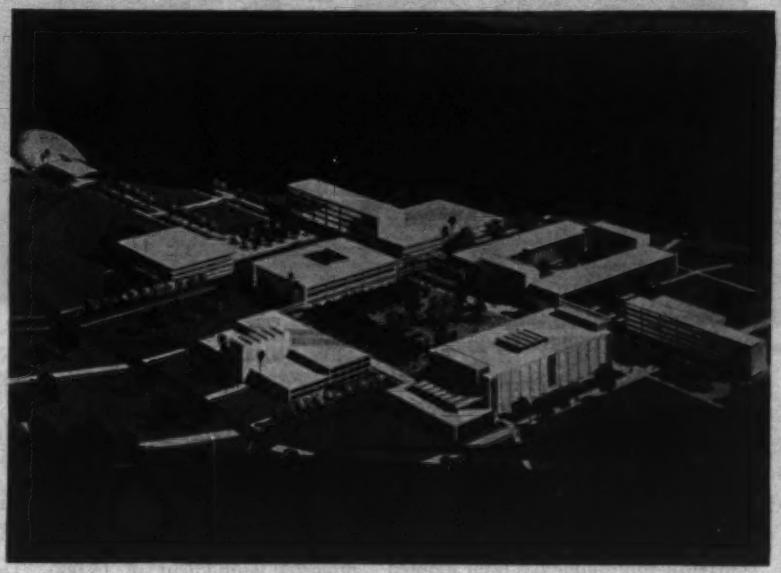
Master plans may be divided into two general categories—centralized schemes and decentralized schemes.

In centralized plans, functions and facilities are closely concentrated. They provide for vertical expansion into high-rise buildings, lateral expansion into open or vacated areas or a combination. While they tend to promote unity within a university, they introduce the problem of high concentration of students.

In decentralized schemes, functions and facilities are distributed. They provide for expansion by locating whole departments or colleges in clusters separated from others, allowing room for growth in the spaces between. They limit concentration of students and traffic, but travel distances may be extended, unless service courses are given in each cluster.

• **Where to place labs?**—Generally, research and teaching should be kept together. But there are some research projects for which a remote location is desirable: Those that are too hazardous, noisy, foul-smelling, or otherwise objectionable to permit a central location; those requiring land area or building space that cannot be provided on the main campus without unreasonable dispersal of other facilities; and those that will be visited infrequently or require undivided attention of the participants for long enough time to justify travel some distance from the main campus.

for Tomorrow's Needs



ORANGE COUNTY STATE COLLEGE is planned to look like this in 1980.

• **Simple types of master plan**—One of the simplest types of plans that satisfies the criteria for good planning is concentric-ring zoning. At the core are located buildings serving the whole student body and to which students must go frequently—administration and student union buildings, library, bookstore. This core is surrounded by general education facilities, which, in turn, are ringed by advanced education facilities. The academic area is served by an outer ring assigned to parking, and the parking fields are encircled by a road. On the other side of the road are campus housing and recreation and athletic facilities.

Another simple type is strip zoning. Academic facilities, student activities and housing are set in separate strips. Expansion takes place by lengthening the strips.

In practice, however, it is seldom possible to fit a college or university into such simple patterns. The site, educational organization and philosophy, or existing structures may not permit their adoption. Sometimes, institutions start out with the simple ring plan but the growth of components requires expansion outside the assigned rings.

• **Some brand new campuses**—A look at some master plans will show how the principles are followed in practice. We'll start with some brand new colleges and universities:

Orange County State College will be situated on a gradually sloping 300-acre site amid citrus groves at Fullerton, Calif. The state division of architecture has prepared a master plan for an enrollment of 20,000 by 1980. (The college will have about 100 students in temporary one-story classroom buildings this fall.)

The campus will be a simple quadrangle; the buildings will be arranged along the sides of a large, rectangular landscaped area. A science building will be the first permanent structure to be erected. Initially, it will house the full complement of courses. An auditorium-theater, cafeteria and gymnasium are scheduled for construction next. And in the offing are a library, fine arts building, classrooms and administration building. Parking space has been allotted around the edges of the campus.

Henry Ford Community College is building its Fairlane Campus at Dearborn, Mich., on a 75-acre site donated by the Ford Motor Co. The campus is planned for 2,625 full-time students and 9,188 part-time students in 1967.

Eberle M. Smith Associates, Inc., Detroit architects-engineers, have grouped the buildings about a sunken court with reflecting pool, planting areas and covered walks. Most buildings have a similar exterior and a uniform roof height. Exceptions are a four-story liberal arts building, which dominates the campus, and the cafeteria, which has a double-curved roof and is the main focal interest of the sunken court.

The University of Hartford, chartered in 1957, will complete the first of 20 planned buildings this fall on a 150-acre site in West Hartford, Conn. It is a consolidation of three old institutions—Hartford Art School, Hartt College of Music and Hillyer College, including the Ward School of Electronics. These have a total enrollment of 10,000.

As planned by Moore & Salsbury, West Hartford architects, the buildings will extend from a lagoon, in the center of which is an island plot for three chapels. The first structure erected is a classroom building that can accommodate 1,000 students at a time. Funds are being raised for seven other buildings considered necessary to form a minimum nucleus. All will be air conditioned.

Florida Presbyterian College will be built on a 160-acre waterfront site donated by St. Petersburg. The campus will be expanded to 260 acres by dredging and filling. Initial facilities are planned for 1,200 students in the fall of 1963. Connell, Pierce, Garland & Friedman, Miami architects; Perkins & Will, Chicago architects, and Jefferson Hamilton, of the architectural staff of the University of Florida, Gainesville, designed the campus layout and buildings.

Generally, the buildings are long, low structures with wide overhangs. They face inward on central landscaped courtyards and pools and outward to a water view. Dormitories, each for 50 students, will be arranged in a cluster around the dining hall. All buildings will be air conditioned.

• **A lusty infant**—Brandeis University took over the defunct Middlesex College campus at Waltham, Mass., on the outskirts of Boston, in 1940. It has been building since in accordance with a master plan started by Eero Saarinen and continued by Harrison and Abramovitz.

Middlesex turned over 90 acres and three or four buildings. Brandeis has added 180 acres and 40 major buildings since 1940. The first class started in 1948, with 104 students. Brandeis expects to level off in Sept., 1964, with 1,500 undergraduates.

The layout may be considered decentralized. Buildings are distributed over the site in related clusters. They are designed to take advantage of the

. . . Expansion plans tie in with urban renewal

hilly landscape and to preserve the natural qualities of the terrain. Access is provided by a circumferential road and secondary loops. Parking areas are scattered throughout the campus.

Older colleges in urban areas find that cooperation of city officials is needed to carry out planned expansion. Many are benefiting from federal-city urban-renewal aid.

• **Breaking the shackles**—Temple University in Philadelphia, confronted with an accelerating enrollment, engaged Nolen and Swinburne, Philadelphia architects, to develop a master plan looking forward 50 to 75 years. Immediate planning is for 10,000 daytime students and an equal number of evening and graduate students. Total enrollment in 15 years may rise to 40,000. The campus will have to expand from the four acres occupied in 1950, when the present growth started, to 140 acres in 1965. With land costs ranging up to $350,000 per acre, Temple is working closely with the City Planning Commission and Redevelopment Authority, and its plans are integrated with the over-all plan for the city's growth.

Originally compressed to a strip along Broad St., a major Philadelphia thoroughfare, the university is now able to escape from traffic. Streets are being erased and off-campus parking is provided. Open areas and courts are being created among the buildings.

The plan is phased out over three stages—to meet immediate needs, to satisfy foreseeable needs, and to anticipate unforeseen needs (for which 12 acres will be held in reserve). It groups buildings in clusters related to each other, to existing buildings and to future structures. Buildings are placed so as to permit gradual elimination of all internal streets.

Classrooms for general university use are interspersed through all buildings, to encourage intermixing of students and exchange of ideas. None of the buildings is assigned exclusively to a single department.

Lecure rooms are in one-story buildings, separated from classroom and laboratory facilities. This reduces traffic in the academic areas and permits the public to use the lecture rooms without intermingling with students. To eliminate the need for elevators, classrooms and laboratories are below the fifth floor, except in a building for the School of Business.

Facilities are planned for intensive, continuous use from 8 am to 10 pm. All buildings are air conditioned to permit summer daytime and evening sessions.

TEMPLE UNIVERSITY aided by urban renewal, will erase city streets as it expands.

• **Ring zoning**—The University of Utah, at Salt Lake City, faced with a doubled enrollment (18,000 students) by 1970 and sprawled over a 450-acre campus, has decided to reorganize its plant for immediate and future development. Martin Brixen, director, department of planning and construction, reports that concentric-ring zoning has been adopted for the master plan. However, the plan had to be adjusted to take into account existing buildings and those under construction.

Future buildings will be three stories high, in general. This was considered by the planners to be a maximum for walking up stairs. On the basis of this decision, the planners were able to assign approximate land areas for specific buildings. Certain groups, such as the College of Engineering, had to be relocated because of limited ground area for expansion. Vacated permanent buildings will be converted to other use.

• **Heating a growing university**—Utility mains, in general, will be concentrated under the mall system, in one primary loop. Buildings will be served by secondary loops. Water at 410 F will be distributed to the buildings, where exchangers will produce steam or hot water for heating, domestic use and other purposes. Since many of the structures are now serviced from an old steam plant near the center of the campus, an exchanger station will be provided near the old heating plant to pick up the steam loads in that portion of the campus when the old plant is removed. Bids will be taken in the near future for the new heating plant and distribution system.

• **Continuous planning pays off**—The University of Florida, at Gainesville, has been growing in accordance with a master plan since its inception. The first plan was drawn up in 1906 and expanded in 1920. New studies of the campus were started in 1925 and again at the end of World War II, when it became evident that a much larger university was going to be needed. A new master plan was submitted in 1948 for a projected enrollment of 15,000. The campus was expanded 150%, to 510 acres (exclusive of 1,200 acres devoted to agricultural farms and field instruction). The plan fitted old permanent buildings into the new land-use pattern.

Unprecedented growth in the following ten years, however, made necessary an expansion of the 1948 plan. But because the land-use plan had been followed strictly during the interim, the expansion presented fewer difficulties than anticipated.

A master-plan revision in 1957 visualizes an enrollment of 20,000. It expands the campus from 510 acres to 690, allowing for growth of instruction areas to the south and of housing to the west.

• **To double or not to double**—Ohio State University, at Columbus, has authorized Caudill, Rowlett and Scott, Houston architects, to develop a master plan. The difficulty the planners face is that there are indications the present enrollment of about 20,000 may increase 150% in the next twenty years, but the faculty is reluctant to consider growth to 50,000 students. The fear is that bigness will lead to impersonal, factory-like handling of students. Hence, the planners are undertaking to devise a plan that will serve the university with only a modest increase in enrollment and yet will be readily adaptable if the huge enrollment should materialize.

. . . Far-sighted master plans pay off

The master plan for Ohio State will be based on the concept that "the basic ingredients in campus planning should be the academic disciplines and the intellectual intercourse among related disciplines rather than the colleges and departments into which these disciplines are grouped for administrative purposes at present . . . The chances of success for a campus plan based on this principle will be enhanced by the designing of flexible buildings, located and designed to permit easy expansion."

The plan will place dormitories at several places around the periphery of the academic area, instead of concentrating them on one side. It will also provide open space, including recreational areas around future dormitories. Consideration also is being given to locating married-student housing in a crescent around the main campus, to help protect the university neighborhood from urban blight already in evidence. Measures, in addition, will be taken to control traffic and parking on the campus.

BRANDEIS UNIVERSITY has erected 40 buildings in 20 years on a picturesque site.

• **Nowhere to go but up**—The University of California at Berkeley is another university, confronted with a possible doubling of enrollment to (42,500 students) by 1970, that would like to set a limit (27,500 students). However, the master plan being developed has to consider the possible increase.

Despite competition for space, the planners are determined to preserve large open areas, to retain the park-like look of the campus. The site consists of hills and canyons, is traversed by Strawberry Creek and is planted with giant eucalyptus and other trees and shrubs. Hence, to keep these vistas, not more than 25% of the land will be covered with buildings.

As a result, the buildings will be tightly clustered according to function and will get bigger, rise higher. Advantage will be taken of the hilly terrain to permit the structures to be entered at grade at the first, second and third floors, where feasible. Buildings on the main, 178-acre academic campus will be kept within a ten-minute walking distance of each other.

Research facilities and structures for special-interest groups, such as the radiation laboratories, will be grouped together, often well away from the campus core. Shops, storage facilities, residence halls, married-student housing, offices of government agencies and private institutions that work with the university, and parking structures also will be located off-campus to reserve land for academic use.

Parking, a major problem, will be helped by addition of 2,000 parking spaces to the present 3,000. Some lots will be open concrete areas on campuses, sheltered and camouflaged with shrubbery. Wherever possible, parking areas will be depressed and tennis courts, a playing field or a plaza located above.

•**Strip zoning**—The University of California at Los Angeles began a building program in 1949 that will have cost more than $370 million by 1967. A master plan developed by Welton Becket & Associates, Los Angeles architects, envisions an enrollment at that time of 27,000. The expansion will involve more than 150 separate projects.

Placement of these projects on the 411-acre campus, with sizable landscaped courts and recreational areas, dictates a slowing down of outward growth and start of an upward push. Instead of rising only three or four stories as in the past, new buildings will go as high as twelve stories.

The master plan divides the campus into three major use areas—academic in the east, recreational in the center and residential in the west, these zones running north and south.

The academic segment is divided into three parts. In the northern part are social sciences, humanities, arts, business administration and law. Engineering and physical sciences are located in the center. And medical and health sciences, including the $30-million Medical Center, are set in the south.

Ten multistory parking structures with a total of 15,000 parking spaces are planned to ring the campus. Parkers will be required to pay $50 per year for close-in parking, less for distant spaces.

• **Extending the campus concept**—University Circle in Cleveland presents an even more complicated problem. There, planners are faced with the necessity of developing a master plan for a "campus" for 30 or more institutions. The largest of these are Case Institute of Technology, Western Reserve University and University Hospitals. The plan attempts a solution looking forward 20 to 25 years.

The 488-acre cultural center will be zoned into three major areas—a teaching, research and medical zone; an area oriented to use by the general public and devoted to the creative use of leisure-time; and a common core with a plaza and facilities for staff and student activities. Implementation of the plan is divided into three periods—one of three years (nearly completed), one of seven years (1960-67) and a final stage of ten years.

• **Findings**—This brief survey of campus plans appears to support two conclusions:

• If a master plan is made in advance for a brand new college or university and growth is controlled by the plan, and if the planning is continuous to keep up with changing needs, then expansion in the future need not be troublesome. And certainly, development of a master plan for a new institution is simpler than drawing one up for an older university already having difficulties.

• Fewer difficulties will be encountered in expansion of an existing institution if growth is controlled by a master plan prepared with foresight, based on accurate estimates of future requirements and made flexible enough to permit adjustment to changing needs.

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ment facility in Fairfax County, Va., uses Mahon Lo
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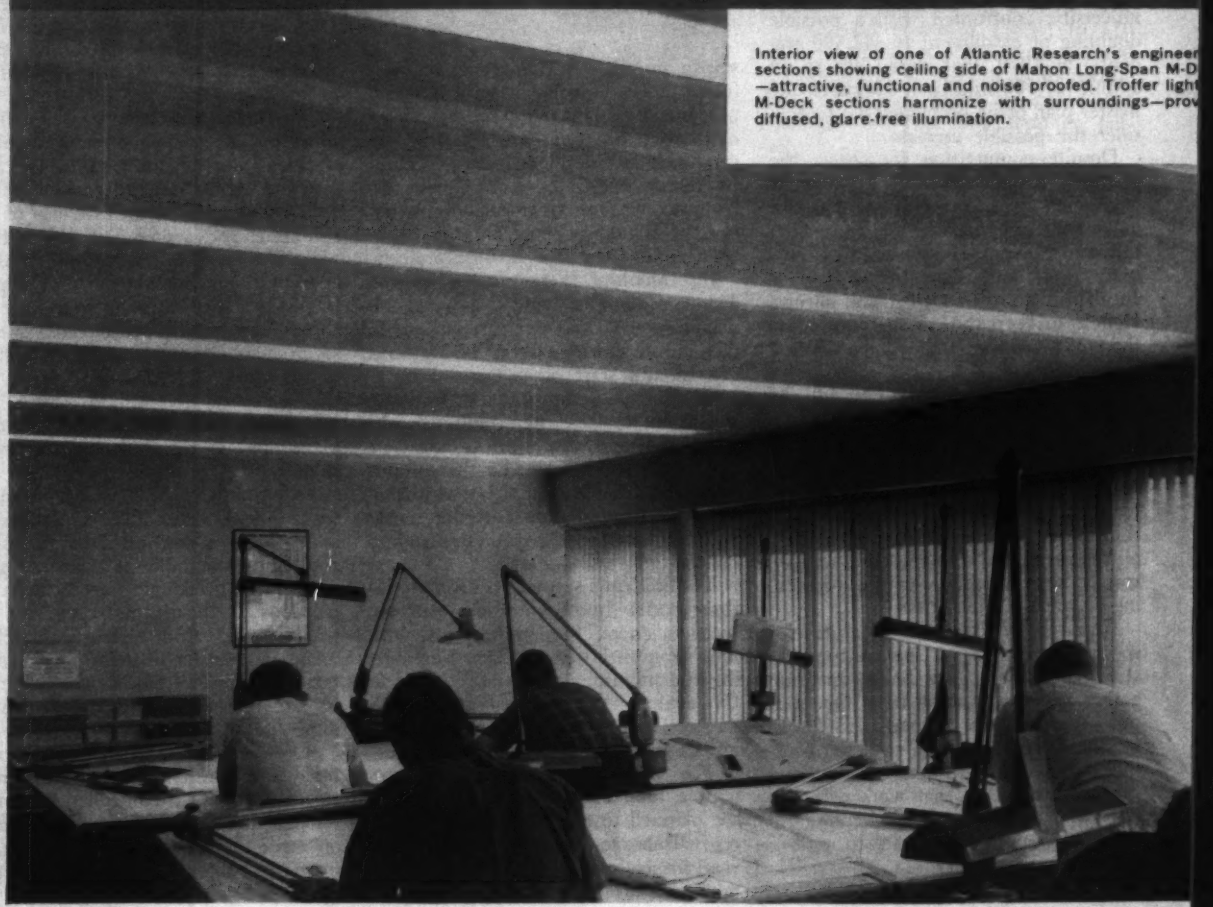

Interior view of one of Atlantic Research's engineer
sections showing ceiling side of Mahon Long-Span M-D
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M-Deck sections harmonize with surroundings—prov
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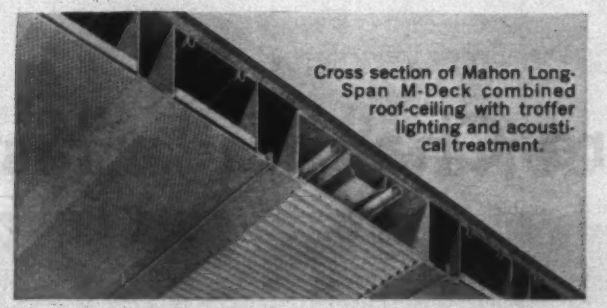

Cross section of Mahon Long-Span M-Deck combined roof-ceiling with troffer lighting and acoustical treatment.

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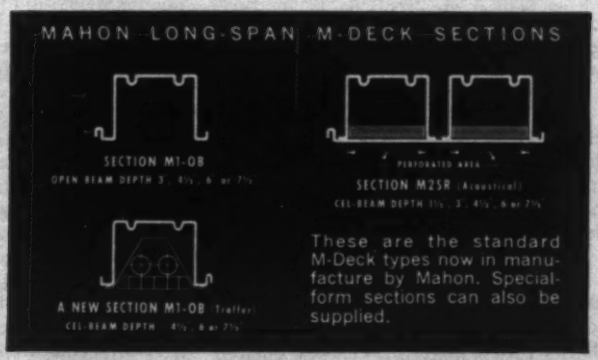
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They Are Changing Classrooms

Educational methods are in a state of flux. Sharp breaks with the past are already on record; and in almost every case, changes in educational philosophy and teaching methods brings changes in design of classrooms, auditoriums, lecture halls, and libraries.

The pot is being stirred violently by a serious prospective shortage of teachers. At present, it seems impossible that enough good teachers can be trained to keep up with accelerating enrollments.

1. Factors Shaping Classrooms

The situation was examined last year in a conference on "New Frontiers in Learning," at Stephens College, Mo. In an excellent report on the conference Lewis B. Mayhew of Stephens wrote:

". . . Three revolutions . . . may be getting started in formal education. One is the revolt against standard-sized classrooms and standard-sized groups of students as the medium of education. Much of educational architecture has been based upon the unstated assumption that most courses can be offered to uniform classes meeting in rooms designed to hold that many or more students. The second revolution is against the concept of the solitary teacher meeting these standard groups. The possibilities of teams of teachers doing a more acceptable job are at least tenable. The third revolution is against optimum grade placement. . . .

"If these revolutions are to be successful, the schools must find mechanical aids and architectural principles which will allow the lock-step of formal classrooms, single teachers and uniform progression through school to be broken. Actually, much of the technical knowledge and some of the psychological knowledge necessary to do this are presently available. . . ."

American technology has produced a wide variety of devices that can be used in education—motion pictures, television, tape recorders, electronic information storing machines, test-scoring devices and high-fidelity recording devices.

• **Need for flexibility**—These educational trends imply for one thing, that buildings must be designed and built to permit alterations with relatively slight cost. Floors and walls should be designed to allow placing and removal of cables for electronic equipment, and cables and outlets should be provided for closed-circuit radio and television in the classroom. Rooms should be equipped for projecting films; they should have blackout curtains or shielded screens and should be mechanically ventilated or air conditioned. Space should be reserved for language laboratories. And buildings should provide easy access to central storage units for books, films, pictures, slides, records, tapes, etc.

Auditoriums and lecture halls are in a sense classrooms for large groups of students. What has been said about audio-visual aids for classrooms, therefore, applies to them also to a considerable extent. However, the size of the hall poses new problems—in air conditioning, lighting, entrances and exits, visibility and, above all, acoustics. Thus auditoriums and lecture halls are also being changed.

2. Library Design Trends

Libraries have been changing since the beginning of the century. Gradually, the concept has been developing that books and readers must be brought together with adequate provision for study and research.

The trend is toward use of open shelves, giving direct access by students to all or a major part of the book collection. The library, no longer merely a place to store books, provides an abundance of special study facilities, in addition to reading tables, in proximity to the book collections—carrels, faculty offices, conference rooms, seminar rooms, typing rooms, etc. Also, it offers audio-visual services—booths, projection rooms, reading areas for microfilm and microcards, and work areas.

In the design of a library, adequate and unobtrusive controls must be established to minimize loss and destruction. Conditions must be such that the library staff can work with high efficiency—lighting and sound conditioning, adequate lighting, particularly, heating and ventilation, of course. And the building should have distinction and beauty, symbolizing its importance as the heart and center of the university's activities, and it should harmonize with its surroundings.

3. Classrooms in Transition

Inspection of classrooms, auditoriums and libraries in the nation's institutions of higher education indicates a transition from the old to the new. Only a few are mechanizing teaching, and only a few are building fixed-sized classrooms for fixed-sized groups of students. By far the majority are constructing facilities at some intermediate stage, kept as flexible as possible in anticipation of the changes ahead.

Kansas State University, at Manhattan, for example, has gone a step away from standard classrooms. Eisenhower Hall, completed in 1951, is two stories high, contains 32 classrooms, each accommodating about 35 students. In contrast, an addition, built this year, has ten classrooms, each seating 100 and one classroom seating 200.

The two-story building cost $451,207 ($16.10 per sq ft). Of reinforced concrete construction, it is 210 ft long, 66 ft wide. Exterior walls are 4-in. limestone backed up with 8-in. concrete block. Windows are aluminum hopper type.

Floors in classrooms are concrete-step construction (amphitheater type) with tablet arm chairs set on the steps. Flooring is linoleum. The classrooms have no windows. Unit ventilators supply outside air and are equipped with coils for heating and cooling the air; the exhaust flows through grills in the doors. Ceilings are acoustic tile; lighting is fluorescent.

The building will be air conditioned. Chilled water for cooling will be pumped from an absorption unit in the central power plant. The cast iron supply and return lines are buried 6 ft underground without insulation. (This is experimental; the designers could find no information on the thermal performance of such a distribution system.) Exhaust steam from the power plant will be used for heating. English, Miller and Hockett of Hutchinson, Kan., were associate architects to the State Architect of Kansas, John E. Brink.

• **TV for teaching**—Delta College, Bay City, Mich., is providing for TV teaching in a classroom building now under construction. Varying in height from one to three stories, the $5.5-million building forms a quadrangle with outside dimensions 227 x 666 ft. From the inner court, most of the building will appear to be one story high; but from the outside, it will look two stories high. The exterior will be brick.

For TV, the college plans to use short-range microwave transmission, instead of cables. Certain areas in widened halls will be designated as "student

Lecture Halls, Libraries

TAPE RECORDERS for teaching languages are among the many devices revolutionizing classroom design.

commons." These areas will be equipped with TV sets so that various programs may be watched by students not enrolled in a particular class. Alden B. Dow, Inc., Midland, Mich., is the architect.

The College of Education building at Wayne State University, Detroit, also incorporates a system of electronic educational aids. It is equipped with a two-way public address system; a television distribution, transmission and receiving system and a closed-circuit TV system. An intercommunicating and recording system is provided for psychiatric research and language study. And all classrooms are designed for use of visual-aid equipment, including light-dimming and other visual controls.

The building is 171 x 131 ft, four stories high. It cost $2 million ($20 per sq ft).

The exterior wall consists of structural precast concrete "trees" surfaced with quartz aggregate. The trees, repeated 120 times around the perimeter, are 40 ft high and have a "spread" of 5 ft. Fixed, anodized aluminum windows are set between the sash. The upper part of each window is glazed with gray glass. The lower part is glazed with gray glass unpolished on the inside, to screen from exterior view the furniture in the perimeter offices.

Framing is a combination of cast-in-place, precast and prestressed concrete. Portions of all floors are framed with precast, prestressed double tees spanning 52 ft. A concrete topping was placed over these for leveling and to conceal electrical conduit and communication lines. Office areas are served by a double-row underfloor duct system for power and telephone distribution. The central core of the building, containing stairways, elevators, toilets and service rooms, is framed with cast-in-place columns, beams and slabs, which anchor and embrace the precast portions.

Interior nonbearing walls are lightweight cinder-concrete block. Partitions in office areas are 2-in. solid plaster. Corridor walls are plastered and covered with vinyl; classroom walls are painted concrete block. Classrooms have luminous ceilings, and floors are asphalt tiled, as are the corridors; offices and clerical areas are carpeted.

The building is heated and cooled with a dual-duct, high-velocity air conditioning system. Classrooms and certain large rooms have individual thermostats. Smaller offices with common exposure are controlled by a single thermostat. Cooling is accomplished with a 430-ton absorption unit. Electrical service is 2,400-v primary, while secondary distribution is 120/208-v, three-phase, four-wire. Minoru Yamasaki and Associates of Birmingham, Mich., are the architects.

• **Divisible TV building**—The University of Miami, at Coral Gables, Fla., plans to go as far as present knowledge permits in gearing its new classroom-lecture building for the electronic era. The building is octagonal in plan with sides about 80 ft long. Each of the eight equal-sized sections on its single level contains 300 seats.

Four of the sections, however, may be subdivided, when desired, into three rooms. Two of the rooms will have

. . . Rooms are not what they used to be

CASE STUDY ROOM at the University of Kansas has U-shaped desks.

50 seats each, and one 200 seats. Thus, the interior can be divided into 16 lecture rooms.

Every room will be able to draw upon the building's audio-visual resources. At one extreme, 16 classes utilizing different facilities can meet simultaneously; at the other extreme, 2,400 students can watch the same lecturer on TV screens.

The building will be equipped with closed-circuit TV, motion pictures, slides, recorded sound, projected writing. And all can be brought into a room by an instructor at the touch of a button.

Sources of these services will be a central service area and a television studio. Storage areas, located in a core leading from the studio all the way through the building, will contain photographic material, transparencies, exhibits, etc., as required by various instructors.

TV sets—about ten to a large room—will be strategically placed so that all students will have a clear view of the screen. The sets may be installed in the floor and moved into position by hydraulic lifts, or suspended from the ceiling. Eventually, when TV projection has been sufficiently refined, the smaller sets may give way to a single large screen. Robert Fitch Smith of Miami is the architect.

• **Hexagons for talk**—The desire of the University of Oklahoma, at Norman, that its Forum Building, now under construction, should be used more for conferences than for lectures led to a completely different building design. All conference rooms are hexagonal in shape, since the hexagon works well for speaking face to face, is economical to construct and can be joined to other hexagons to comprise a building.

The new steel-framed building consists of a two-story central hexagonal section, with sides about 65 ft long, and three wings, each 151 ft long and 82 ft wide. The central section houses a 500-seat conference room. Each wing contains six 25-seat hexagonal rooms, with 17-ft sides, set on opposite sides of a central corridor. One wing has a 150-seat room at the end, the others a TV studio and an exhibition area.

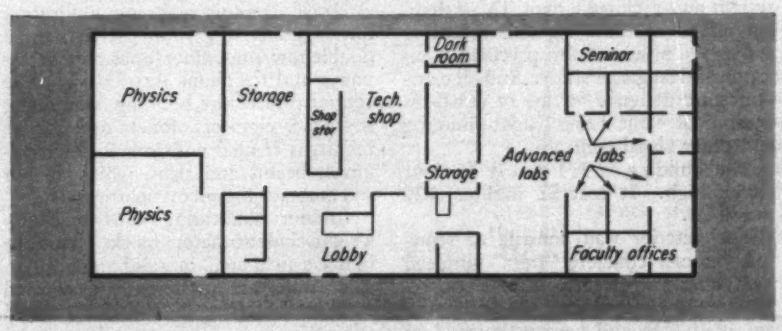
Some meetings to be held in the 500-seat conference room will require use of teaching materials and equipment, such as a chemistry or home economics laboratory demonstration unit. The designers had to develop a convenient "back stage" for such equipment so that it could be changed rapidly. The solution was to make the central part of the floor an hydraulic elevator 20 ft in diameter The elevator descends to the basement for loading and unloading.

• **Trend in engineering buildings**—Colleges of engineering and science have additional educational problems. They have to provide laboratories, as well as classrooms and lecture halls, to give students an opportunity to learn by doing and to prepare students for research careers. The following buildings are of interest because of one or more outstanding features:

A science-mathematics group at the new Florida Presbyterian College, St. Petersburg, is noteworthy because of the virtual elimination of corridors (see plan below) provision for various-sized classes and allowance for small study and experiment areas. The buildings are air conditioned. Architects are Connell, Pierce, Garland & Friedman of Miami, and Perkins & Will of Chicago, with Jefferson Hamilton of the University of Florida, Gainesville, as consultant.

• **Movable exterior for growth**—The Engineering Center at the University of Utah, Salt Lake City, was designed to be constructed in four phases due to legislative budget appropriations. The first phase, containing facilities for the chemical and electrical engineering departments, has been completed at a cost of $754,000 ($11.40 per sq ft). The second phase, now under construction, will house the civil and mechanical engineering departments; it will cost $800,000 ($12.50 per sq ft). These units are three stories high. The $2-million third phase will be started in 1961 and the $1.5-million final phase in 1963, including an 80,000-sq-ft, six-story classroom, library, drafting room building.

The exterior walls had to be designed to permit removal and relocation for expansion. The curtain wall consists of



NO CORRIDORS are visible in the Physics Building at a new Florida college.

. . . Exteriors, too, reflect changing times

PRECAST TREES form the facade of a classroom building at Wayne State U. in Detroit, equipped for TV teaching.

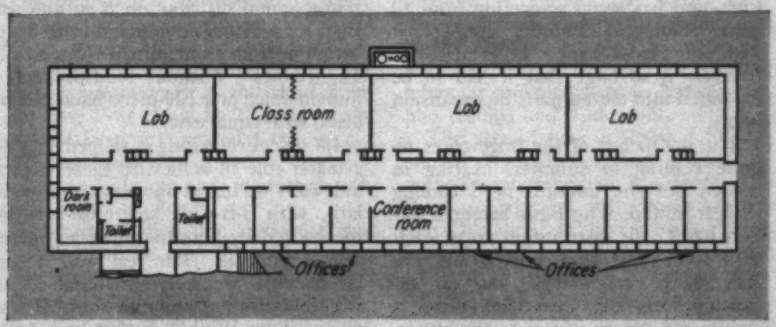
structural aluminum mullions bolted in place and tempered-glass spandrels porcelanized on the inside. Windows are glazed with a glare-reducing, heat-absorbing gray glass mounted in a neoprene gasket. Framing is welded structural steel. The entire building was planned on a 5½-ft module, which worked out well for offices, classrooms and laboratories and was within all curtain-wall limitations. Dean L. Gustavson Associates, Salt Lake City, were the architects.

• **Composite construction**—Structural framing is one of the outstanding features of the four-story biological laboratory addition to Guyot Hall at Princeton University, Princeton, N. J. Concrete floor slabs were designed by Seelye, Stevenson, Value & Knecht, New York City consulting engineers, to help the steel beams carry the loads, with welded studs as shear connectors. O'Connor & Kilham, of New York City, were the architects.

• **Tightening intercommunication**—An $8-million Engineering Quadrangle also is under construction at Princeton, to correct a deficiency in space for research and intercommunication between departments. Princeton has converted the programs of study from the traditional toward engineering science. The new facilities will reflect this educational philosophy in the close physical relationship of all departments.

The Quadrangle is composed of five 4-story buildings and a three-story library, all interconnected with glass-enclosed units. Design of the laboratory-classroom buildings is based on an 11-ft module. A typical floor has laboratories and classrooms on one side of a central corridor, offices on the other side. Voorhees, Walker, Smith, Smith & Haines of New York City are the architects.

Cooper Union for the Advancement of Science and Art, New York City, is constructing a partly air conditioned, multistory, multiwing structure for its $4-million School of Engineering. Laboratories and classrooms will be housed in the largest wing, which is seven stories high. Its 200x80-ft floor areas are bisected by a single row of columns, so that there are large open spaces at each level to meet the requirements of a fluctuating program. A 9-ft module was used for the laboratories along one side of the wing and an 11-ft module for the classrooms on the other side.



CENTRAL CORRIDOR used in Princeton engineering building is a typical arrangement.

. . . New solutions to teaching needs

AUDITORIUM at UCLA was designed to achieve near-perfect acoustic performance.

Laboratory services originate in a penthouse and run downward at 18-ft intervals, each shaft supplying two modules.

Perpendicular to this wing is a five-story wing housing faculty and administrative facilities. Each floor will have eight 10x14-ft modules on both sides of a central corridor. The third wing, at the intersection of the other two, is one story high and contains a student lounge and 190-seat lecture room. Voorhees, Walker, Smith, Smith & Haines are the architects.

• **Medical buildings**—The $21-million Stanford Medical Center, built on 56 acres of Stanford University's campus, at Palo Alto, Calif., is distinguished both by exterior appearance and interior planning. The center consists of three hospital and four medical school buildings interconnected by numerous arcades and covered walks. The buildings form an H, surrounding pools, fountains, gardens and patios.

The buildings, of reinforced concrete construction, are a uniform 40 ft, three stories, in height. Walls and columns are textured, and a precast concrete grillwork of similar design is used to screen the courtyards and walks.

Each "multidiscipline" laboratory will serve 16 students as a "home laboratory" for a full year. Each student will occupy an assigned laboratory space, with provision for books and equipment, and will be able to use his space at any time. The medical school has an enrollment of 250 and the school of nursing, 100. They occupy one long arm of the center's H, the hospital the others; the bar of the H houses admitting offices; rehabilitation center; X-ray, surgery and emergency rooms; and all service facilities. Edward Stone of New York City was the architect.

• **Massive structure**—The new $30-million West Virginia Medical Center at Morgantown was faced with a similar problem of integrating teaching and hospital facilities. The solution, however, was different; the 1,256 rooms in the Basic Sciences section and the 2,156 rooms in the Teaching Hospital are placed in a single, air-conditioned building 950 x 545 ft, ranging in height from six to 14 stories.

The Basic Sciences section occupies a 225 x 255-ft central core, five stories high, and has wings projecting from all sides. Outpatient clinics connect it with the cross-shaped hospital. The building is so large that it had to be separated into eleven parts by expansion joints.

The perimeters of the huge cores require cooling in summer, heating in winter; but the interiors need cooling all year 'round. The Basic Sciences section has 17 air distribution areas, each with 30 or more zone controls. In general, air is recirculated. But air exhausted from the virus laboratories is incinerated before release to the atmosphere. And separate exhaust systems serve high-level radiation, laundry, kitchen and other specialized areas.

TV can be originated at 28 separate points, received at 99 outlets in the Basic Sciences section. Students can observe surgery in color. C. E. Silling & Associates, Charleston, W. Va., were the architects, with Schmidt, Garden & Erikson as associate architects.

• **Emphasis on acoustics**—Music buildings present different problems, in that much greater emphasis is placed on acoustic conditions throughout rather than only in special areas.

The new music building at San Fernando Valley State College, Northridge, Calif., for example, places offices and classrooms in one wing and rehearsal and practice rooms in a second, isolated wing, both two stories high. The $2-million, reinforced concrete, air-conditioned building is 242 ft square, the two portions being separated by a 108 x 120-ft inner court. Two bridges connect the wings at the second floor.

Classrooms and practice rooms are isolated with double floors and walls, and mechanical equipment is acoustically insulated. Walls and ceilings are splayed, to bounce off sound in all directions. Acoustic materials are balanced with hard, reflecting polycylindrical surfaces. Only the offices have windows.

The building has a central music and recording distribution system, which serves all classrooms and half the practice rooms. Tapes and records will be kept in a central library. Allison and Rible of Los Angeles are the architects.

Similar principles were applied to the music building of the University of California at Los Angeles. This building, however, presented an additional problem in that it incorporates an auditorium seating 525 that required special acoustical study. This was made with plastic models having transparent floors and aluminum ceilings. Light rays were bounced off the components to obtain an optimum acoustical design. As a result, sound distribution is so uniform that, for a 500-cycle source on the stage, variation from front to rear rows is only 1½ decibles. Without loudspeakers, a human voice or a 120-piece band can be heard with equal ease.

Its reflective ceiling is shaped to play a major role in achieving these effects. Sidewalls are furred-out plaster on metal lath, with 3-ft-wide strips of acoustic tile backed by floor-to-ceiling air spaces at 2-ft intervals. The rear wall is surfaced with absorptive material. The structure also has a double roof. It was designed by Welton Becket and Associates, architects-engineers, Los Angeles.

. . . Classrooms move into the library

• **Rotating room**—The problem of introducing prepared demonstrations may be solved for a physical sciences lecture hall planned for the University of California at Berkeley by a revolving stage. It will be 40 ft in diameter and divided into three parts, two of them being offstage while the third is in use. Thus, demonstrations can be prepared or dismantled while class is in progress.

Each section will have sliding chalkboards and a demonstration table, including a hood for removal of gases. TV cameras and screens in the lecture hall will make demonstrations clearly visible to all. The design was proposed by Prof. Harvey E. White. Anshen and Allen, of San Francisco, are the architects.

4. Libraries in Transition

Trends in library design are revealed by three projects, one under construction, one on which construction will start in the near future and one that has been proposed.

The new Goldfarb Library at Brandeis University, Waltham, Mass., built at a cost of $2¼ million ($22.50 per sq ft), is 204 x 138 ft, three stories high, and can store 750,000 books. Typical bays in the reinforced concrete structure are 22½ ft square, based on 3-ft-long book stacks spaced 4 ft 6 in. c-c. In addition to book storage, the library also provides art, music, audio-visual facilities, reader service and film slides. It has reading space for 750 students. A music area contains sound-proofed listening booths for individuals.

On the main floor of the air-conditioned building are the main charging desk, reserve books, reserve reading room, major reading room and browsing rooms, card catalogs and exhibit areas. The mezzanine is devoted to the sciences and social sciences. The ground floor contains theater arts material, music seminar rooms, reading rooms and listening areas. Harrison & Abramovitz of New York City were the architects.

The library-humanities center under construction at Case Institute of Technology, Cleveland, will be 171 x 84 ft, six stories high. Built into a bluff, it will have the main entrance from the upper campus level at the third floor. Bays are 25 ft 10 in. by 27 ft to accommodate 3-ft stacks spaced 4 ft 6 in. c-c. Framing consists of structural steel columns and girders and reinforced concrete waffle-slab floors.

The first floor of the air-conditioned building will be used for book storage. The second floor, devoted to general library use, will house listening booths, microfilm and microcard readers, a large music room and carrels. Library areas on this and the floor above will have a seating capacity of 497, the books being stored on open shelves. The fourth and higher floors will contain classrooms, lecture rooms and offices. Small, Smith, Reeb and Draz of Cleveland are the architects.

LIBRARY at Brandeis, like most new ones, opens book shelves to the students.

The Undergraduate Library, Seminar and Classroom Building at the University of Pennsylvania, Philadelphia, for which contracts have been awarded, is 120 x 200 ft, eight stories high. Public functions are concentrated on the first three floors of the air-conditioned, reinforced concrete building, book stacks and book users on the next three floors, and rare book and special collections on the top two floors.

The ground floor is organized around two functions that must have access to ground level—the undergraduate library and receiving and shipping departments, including a bindery and sorting area. The main floor contains all the elements of the library for which access to the public catalog is necessary—circulation, reference and preparation departments, plus reading and study areas.

The second floor is devoted to staff offices, microfilm reading room and microfilm photographic laboratory. The third, fourth and fifth floors provide space for about 1,200,000 books. Study facilities and seminar classrooms are adjacent to the stacks, which are open for use by all the students and faculty. The stacks on the top floors, housing rare works, are closed. Harbeson, Hough, Livingston & Larson of Philadelphia are the architects.

• **Learning Center**—Eldridge T. Spencer, San Francisco architect, has proposed an extension of the undergraduate library concept that he calls the Learning Center for construction at Stephens College, Columbia, Mo. It would combine recorded material—books, tapes, films, art and artifacts—with means for their dissemination—TV, radio, carrels, study rooms, reading court and library service. Housed in a three-story cylindrical building, these facilities will be arranged around an open center "to prevent corridor-type regimentation."

The circulation desk will be centrally located on the first floor, which will have two entrances. Catalog, stacks, microfilm, reading court, carrels and librarians' office and staff room also will be on the first floor. Two TV studios, two radio studios, a library of sound and necessary services will be placed in the basement. Offices of the literature faculty will be set near a browsing room on the second floor, along with two 30-seat classrooms. The third floor will house a gallery of fine art originals, surrounded by display and reading areas, plus two 60-seat classrooms with audio-visual equipment. Thus, students and the various forms of recorded material will be brought into close contact daily.

This is the picture of the American classroom in transition.

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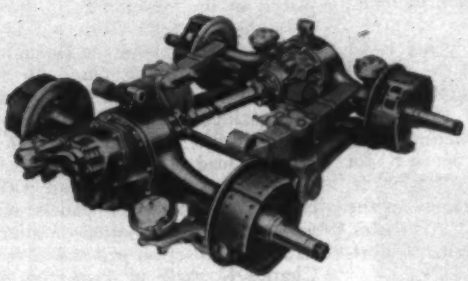

■ New Eaton-Hendrickson Bogie

Key component in Chevy's new M70 tandems is the new Eaton-Hendrickson rear suspension, built for bruising hauls with two big 16,000-lb. Eaton axles and a husky Hendrickson suspension. These bogies feature a new, single, straight through drive line which means less strain and wear on the universal joints for lower maintenance. A new inter-axle differential that divides the driving load equally between axles provides more efficient utilization of engine torque. Rugged walking beams and husky torque arms keep axles equidistant and wheels tracking straight and true for less tire and component wear. And two heavy-duty 12-leaf springs cushion and support the heaviest loads. Here's the most advanced tandem suspension available today . . . and it comes to you with a design that's been work-proved on truck jobs all over the world.

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College Research Facilities

Institutions of higher education have a responsibility to do much more than teach what is already known or suspected. They must also play an important role in extending knowledge. In recognition of this, colleges and universities stimulate research and provide research facilities for students and staff.

It is impossible to describe even briefly typical examples of each type of research facility recently built or planned; the variety is too great. Suffice it to say that, with few exceptions, research buildings are getting more and more complicated. They require equipment and materials unheard of only a few years ago. They draw unprecedented amounts of power. They call for flexible room sizes, heavier structural framing, air conditioning with controlled air circulation to prevent spread of contamination. And often they need new types of enclosure—one-way glass around rooms for study of human behavior; soundproof partitions around music, language and noisy experimental laboratories and around psychology-interview cubicles; radiation shields around radioactive experiments and small-particle accelerators; and grounded shields around sensitive electronic equipment.

Important features of laboratories built in conjunction with teaching facilities were discussed in the article on p. 46. The following will concentrate on a few research buildings recently built, now under construction, or planned, to illustrate in a general way the type being erected under current college and university expansion programs.

• **Building designed as bridge**—The science building planned for the University of Oregon, at Portland, will be outstanding both for its exterior appearance and its framing, which developed as a solution to a specific problem posed by the site. The building is to be constructed in phases, the first consisting of two wings. One wing will be for the geology department. The other, with an unusual facade and framing, will house research facilities. Its site proved troublesome because of two existing one-story, 50-ft-wide buildings, a service alley and city street. The designers chose to have the new wing bridge them.

The "bridge" will be four stories high initially but is designed for vertical expansion to eight stories. Also, it will serve as a connection with future components of the science center.

Framing for the wing will consist of a four-tier lattice truss at each long side of the building. The steel trusses, 48 ft apart, will span 155 ft between two reinforced concrete towers and cantilever about 25 ft beyond. The towers will house stairs and elevators. The trusses, each 10 ft 4 in. high, and structural steel beams spanning between them are designed for composite action with the concrete floor slabs. (Analysis was performed on a structural model.)

The exterior wall will be set back a few feet inside the lattice trusses, which will form the unconventional facade of the wing. This arrangement will permit flexibility in size and location of fenestration.

Total cost for the first phase is $1 million ($13 per sq ft) for the general work, $413,000 ($5 per sq ft) for the mechanical, and $167,000 ($2 per sq ft) for the electrical. Structural steel cost is $337 per ton ($2.81 per sq ft) for a steel weight of 16.6 lb per sq ft. Lawrence, Tucker & Wallman are the architects, Cooper & Rosé & Associates, the structural engineers—both of Portland, Ore.

• **Exhaust influences design**—In contrast to this building in which structural design determined exterior appearance, the exhaust system was an important factor in shaping the facade of Chemistry Unit I to be constructed for the University of California at Berkeley. Exterior reinforced concrete columns will be large and project in front of the building face. They will be hollow, and this space will be used to conduct exhaust gases and air from the laboratories vertically for discharge into the atmosphere at the roof. Fans pulling the air and gases up will be located behind a masonry grill on the roof.

The air-conditioned building will be eight stories high and will cost $6.1 million ($32.60 per sq ft). The air conditioning will be a once-through system. Pressure will be maintained higher in the corridors than in the laboratories, to prevent inward flow. The air, taken in at ground level, will be exhausted from the laboratories through the hollow exterior columns. Anshen & Allen, of San Francisco, are the architects.

• **Computers on the campus**—High-speed electronic computers continue to play an ever-growing role in research on college campuses. While the computers frequently are housed in a building with other research facilities, there appears to be a trend to place them—at least the larger ones—and the computer staff in a separate building. Sometimes, also, there are special reasons for separate facilities.

For example, an office and computer building is being constructed at Princeton University, Princeton, N. J., for the Communications Research Division of the Institute for Defense Analyses. The air-conditioned L-shaped building consists of a 132x45-ft, two-story office wing, a 64x52-ft, one-story computer wing and a 30x25-ft one story link between them. The computer will be placed in the basement.

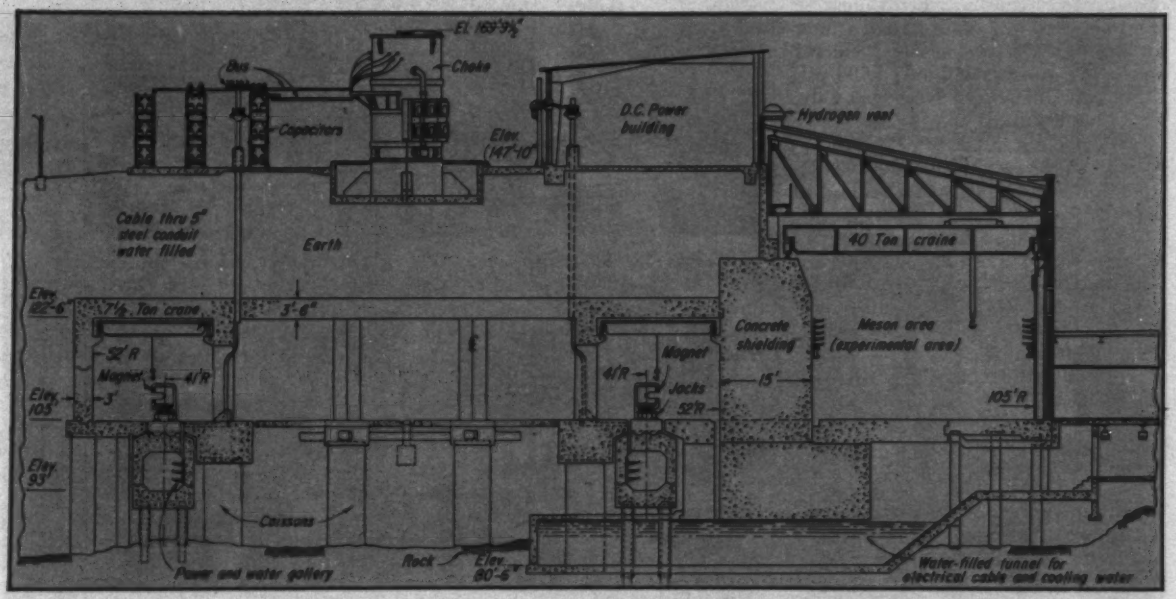
In the computer room, a 1,213-sq-ft area is elevated above the concrete floor to provide 9-in. clearance for cables. The raised aluminum deck, supplied and installed by Liskey Aluminum, Inc., Glen Burnie, Md., is designed for a uniform load of 250 psf and a 1,000-lb concentrated load placed anywhere. It consists of 2-ft-square panels surfaced with vinyl tile, supported on aluminum stringers and set on pedestals 2 ft apart. Charles K. Agle of Princeton, N. J., was the architect; Fraioli-Blum-Yesselman, of New York City, were the structural engineers.

• **Electronic isolation**—Important discoveries and improvements in use of electronic devices for measurement of biological functions and diagnosis and treatment of animal diseases has led to construction of a physiological instrumentation research laboratory at Iowa State University, Ames. The three-story building will be air conditioned by absorption units fed surplus steam from the campus' central power plant.

The reinforced concrete structure contains 600-sq-ft surgery and recording rooms, which are shielded to prevent radio-frequency interference. Floors, walls and ceilings are formed with ¾-in.-thick plywood faced with zinc-coated steel sheets. Continuous metal battens clamp the panels together, and the room is directly grounded to earth with copper cables. The floor is covered with conductive vinyl.

Since the metal rooms are in the upper part of the building, lightning

Are Getting More Complex



PARTICLE ACCELERATOR at Princeton is one of many unusual, complex buildings being erected for research.

rods will be placed on the roof to reduce the hazard of lightning. No water or steam pipes enter the room. All electrical wires coming in are electrically filtered. Dougher-Frevert-Ramsey of Des Moines, Iowa, were the architects.

• **Particle accelerators**—The search for more knowledge of the atom, and especially of the nucleus and forces holding it together, is leading to a wide variety of research devices and facilities to shelter them. Included are many high-energy synchrotrons and cyclotrons. The main problems in designing these buildings are to provide adequate shielding against harmful radiation and escaping high-energy particles and to assure rigid foundations to support the sensitive devices.

The Cambridge Electron Accelerator at Harvard University, which will cost $6.5 million, is one example. The most powerful electron accelerator in the world, it will be able to impart 6 billion electron volts (bev) to electrons.

The circular tunnel building for the accelerator is below ground, sheathed in concrete, with a 5-ft earthfill over the top. Heavy-concrete blocks forming a portion of the wall can be arranged to allow narrow beams of radiation to emerge into the large experimental building where experiments will be located. The synchrotron will have a ring of magnets set in a circle 236 ft in diameter, to race electrons around the circular track at nearly the speed of light. Charles T. Main, Inc., Boston, designed the facilities.

CIRCULAR SYNCHROTRON is shielded with a 20-ft-deep earth cover.

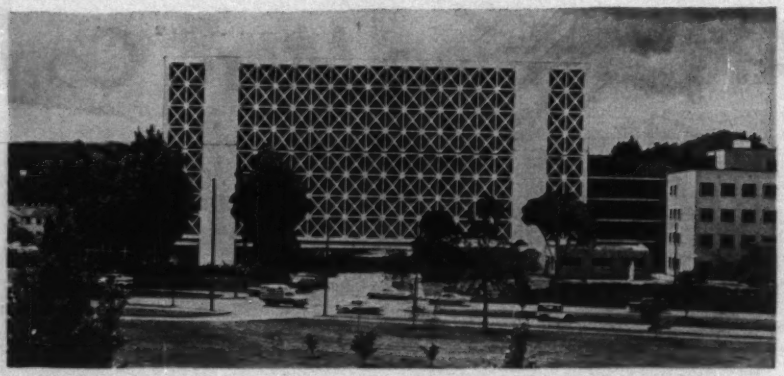
The Princeton-University of Pennsylvania 3-bev proton synchrotron under construction at the James Forrestal Research Center, Princeton, N. J., is similar in design, but smaller. With supporting facilities, its construction cost will be about $3.3 million.

The concrete accelerator building is approximately circular. It contains a shielded magnet ring for accelerating protons around an 82-ft-dia circular track and a semicircular experimental area along the shield. Portions of the shield are removable for experiments. The roof over the magnets carries about 20 ft of earth for shielding.

Close tolerances were set for settlement and deflections of foundations. Though the magnets are set on screw-jacks to permit adjustment, a vertical,

. . . Novel framing for research buildings

radial or circumferential displacement due to settlement is limited to 0.030 in. and tilt to 0.0002 radians. Displacement due an adjacent 30-ton live load is not permitted to exceed 0.060 in. laterally or 0.015 in. vertically, and tilt must be less than 0.0001 radians. Design floor loading near the magnets is 2,500 psf and in the experimental area 4,500 psf. Gibbs and Hill, Inc. of New York City, were the engineers.



EXPOSED TRUSSES carry science building over a street and low structures.

• **How to house 100,000,000°C**—Research in atomic energy also has lead to development of a wide variety of devices and facilities for housing them. Until recently, most of these devices were nuclear reactors of various types; but now new devices are coming into use, and the buildings for them present different problems.

Since it is theoretically possible to obtain energy from fusion of nucleii, research now is under way all over the world to find out how to do this. A $35-million project to investigate one promising aspect is being sponsored by the Atomic Energy Commission and directed by Prof. Lyman Spitzer, chairman of the astronomy department, Princeton University. Called Project Matterhorn, the research will be carried out in facilities being constructed on a 35-acre site at the James Forrestal Research Center, Princeton, N. J.

Success in controlling the fusion reaction requires heating the fuel (deuterium, heavy hydrogen) to temperatures of 10,000,000°C to 100,000,000°C. No material barriers can be used to confine the fuel in this temperature range. The trick is to use magnetic fields to hold the fuel away from the enclosure. The device developed by Professor Spitzer for doing this is called a Stellerator.

In essence, the Stellerator is a vacuum chamber formed into a racetrack-shaped endless tube. Made of stainless steel, this tube is 8 in. in diameter and 40 ft long. To develop the fusion reaction along the axis of the tube, large, water-cooled, magnetic coils encircle the tube, to squeeze the heated and ionized gas into a continuous rope of plasma. Radio-frequency coils at various points along the tube heat the gas to fusion reaction temperatures.

Two types of electrical energy are required to operate the device—dc for the magnetic field and high-power radio-frequency for heating and ionization. Three motor-generator sets will produce 200,000 kw of dc for the Stellerator. Each set consists of a 7,000-hp motor driving four generators, each with a peak output of 16,700 kw at 750 v. The power is transmitted to the Stellerator through 5,000 ft of 1½ x 6-in. copper bus bars. Radio-frequency power will be generated by electron-tube oscillators and amplified by giant water-cooled power amplifier tubes; also, by capacitors discharged through triggered spark gaps.

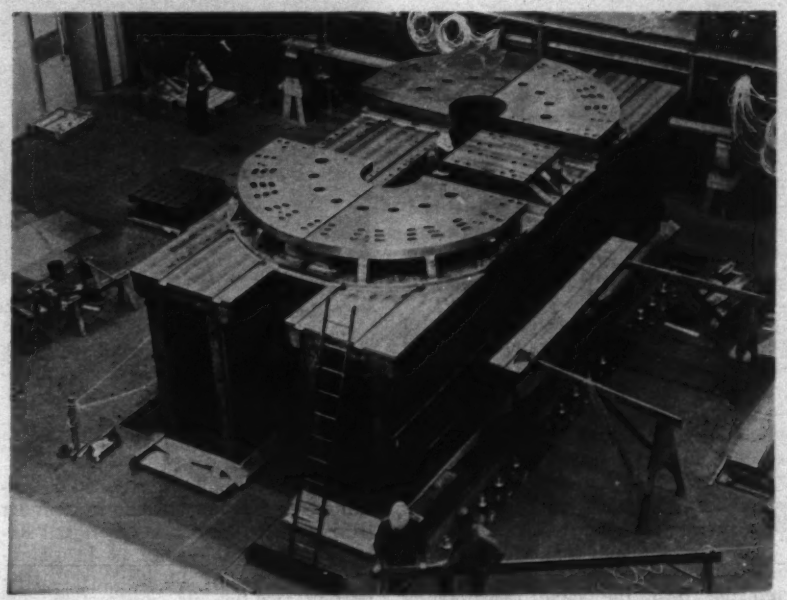
Construction for the Model C Stellerator (Models A and B were smaller scale experiments) is divided into two phases—Phase 1-A costing roughly $2.5 million and Phase 1-B costing $7.5 million.

Phase 1-B buildings include a 225 x 80-ft, motor-generator building, one story (56 ft) high, and the 213 x 100-ft C Stellerator Building. The latter is divided into a four-story section for radio-frequency equipment and a one-story (55-ft) section for the Stellerator. These buildings are framed with structural steel. Exterior walls are asbestos-cement sandwich panels 1¾ in. thick.

An interesting feature is the floor system supporting the Stellerator, which had to be designed for a 4,500-psf live load. Since there is a basement below, the device is supported on structural steel beams and columns with an average weight of 100 lb per lin ft and having flanges more than 1 in. thick. Phase 1-B buildings were designed by Commonwealth Associates, architects-engineers, Jackson, Mich.

The master plan for Project Matterhorn and the design of Phase 1-A buildings were developed by Walter Kidde Constructors, Inc., New York City.

This survey of research buildings, short and spotty though it is, does indicate the wide variety and growing complexity of construction for college research.



BED for fusion device imposes unusually heavy loads on structural framing.

This unsprinklered building, housing two laboratories, was completely destroyed by fire. Spontaneous combustion was the suspected cause. Loss was put at $1,000,000.

Why it doesn't pay to experiment with Fire Safety in a college lab

The total number of school fires each year approaches 5000, or almost 13 a day. Among the most frequent places of origin are storage rooms and unused areas; classrooms; auditorium and stage; furnace rooms and laboratories. They start most often through faulty electrical wiring; heating and cooking equipment; smoking and matches; spontaneous combustion.

SCHOOLS CAN BE PROTECTED AGAINST FIRE. Grinnell Automatic Sprinklers stand ready to stop fire — and its threat to life and property — any time, any place. According to records maintained by the National Fire Protection Association (a non-profit, educational organization) there has never been a loss-of-life fire in a school building completely protected by automatic sprinklers.

TYPICAL CASE HISTORIES.—JAN. 28, 1960. A boy started a fire in a closet at St. Peter's School, Poughkeepsie, New York. One sprinkler extinguished the blaze in this 90-year old, brick constructed, wood-joisted building before firemen arrived.

DECEMBER 6, 1956—In a large grammar school . . . when the latch on a boiler door failed to hold, hot gases from the flames caused a sprinkler to go into action before any combustible material was ignited.

THE COST OF FIRE VERSUS THE COST OF SPRINKLER PROTECTION. It has been estimated that the cost of installing automatic sprinklers averages between 2% and 4% of the cost of a building. But building construction costs have doubled since 1947. So it is possible to provide complete sprinkler protection for most buildings today for only a fraction of their replacement costs. Moreover, insurance premium reductions are immediate, which helps to pay for the installation.

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Economics Are Shaping the

Few institutions of higher education today can afford the elaborate, low, multi-entrance dormitories of the past. Instead, the need to provide quarters for large numbers of students, coupled with rising construction costs, is fostering a trend to austere, though often colorful, high-rise buildings.

The importance of after-class environment in a residence hall as a part of a student's total education is widely recognized for its contribution to development of personal character, social responsibility and good patterns of behavior. Dormitories must do more than provide space for sleeping, studying, eating and storing books and clothing. Yet, the "extras" of dormitory life—companionship, social contacts, discussions and recreation—are becoming difficult to attain as the size of the student body increases.

• **What size dormitories?**—In this connection, in reporting on the needs of the Ohio State University, Caudill, Rowlett and Scott, Houston architects, recently said: "Studies have shown that the desirable-sized social group in which university men have been individually able to identify themselves is 70 to 100; with university women, 25 to 40. We also know that the dining hall is an important center for interaction with larger groups, especially if this facility is shared by men and women students. It is also possible to establish a dining facility which is economically feasible with as few as 350.

"The social group tends to organize around the 'floor' rather than a group of floors. Therefore, it is desirable to provide such amenities as the living room, the recreation room, the 'quiet' room, etc., for each floor. (Desirable grouping around one lounge is 25 to 30 students.)

"Four stories is the maximum desirable height for walkup domitories, and even this height poses problems for students moving in and out of the dormitories each year. On the other hand, elevators become justified with heights exceeding seven stories."

1. High-Rise Dormitories

The eight new residence halls built for the University of California, at Berkeley are a good example of the high-rise type now being built. Nine stories high, they were built in groups of four, forming two quadrangles on a 2.7-acre site. In the center of each quadrangle is a one-story building containing dining rooms, kitchen, offices and recreation room. The block separating the two quadrangular units will be developed into recreation fields with an underground parking garage.

The nine-story towers are 135 x 35 ft in plan. Each will accommodate 210 students, about 25 to a floor. Some will house men, others women students, two to a room.

The residence halls are of reinforced concrete construction. Exterior walls also are concrete, except that at alternate levels spandrels are colored metal panels. A 30-ft-wide concrete grill extending the height of each building screens the utility core. Each tower is served by one elevator, an inside stairway and an outside fire stairway.

The one-story dining hall in each quadrangle has a double-curved thin-shell concrete roof. Exterior walls are all glass.

• **Typical bedroom**—Student rooms are 13 x 14 ft. They accommodate two beds, desks, chairs and chests of drawers. A floor-to-ceiling closet, with sliding doors, is placed on both sides of the entrance. Outside the closet is a rod for hanging additional clothing, and on the floor a low unit with drawers.

Windows are opposite the door. They start 34 in. above the floor and extend the width of the room.

Interior walls are 2-in. solid plaster. Ceilings are covered with acoustic tile, floors with linoleum. Mirrors are clipped to opposite side walls, and above them are incandescent lights, with an outlet for shaving. There are also three duplex outlets in the room for lamps. Doors are solid core wood and are painted. Hot-water convectors heat the rooms. A hook strip is provided at the top of the walls for hanging pictures, and there is a vinyl-covered, cane-fiber tackboard behind the door in each room to serve as a bulletin board.

• **Study rooms**—Every other floor contains a study room about the size of two student rooms. Walls are plaster, ceiling acoustic tile, floor linoleum, lighting incandescent. One wall incorporates glass sliding doors to give access to an outdoor balcony. The room is equipped with a long table, sofa and chairs, and can also be used for meetings.

• **Laundries and baths**—Each tower has two laundry rooms on the upper floors, but not at the same level as the study rooms. The laundries have washers, driers, wash tray, ironing boards and soft-drink machines. Along one wall is a drip-dry area with a tile trough below leading to a drain.

Every floor is provided with a 28x15-ft bathroom. It is equipped with five shower stalls, five lavatories, lockers, five water closets (in men's dormitories two of these are urinals). Each tower has two bathtubs, replacing two showers.

Three kitchenettes are now being added to each tower. These will have stainless steel units—refrigerator, electric burners, cabinets, but no oven.

• **Supervisor's quarters**—Each resident hall is directed by a head resident, who has an apartment on the first floor—the size of two student rooms plus a kitchen between bedroom and living room and a bathroom.

• **Group rooms**—Public rooms are located on the ground floor. Included are a library, two date rooms (officially called multipurpose rooms) and living room. The rooms are heated by forced warm air. They have vinyl-covered floors, acoustic mineral tile ceilings, painted plaster and stained wood-panel walls. The living room is 75x35 ft and has a large fireplace at one end (a common characteristic of student lounges everywhere). Nearby date rooms, 15x8 ft each, are furnished with sofa and chairs. The library is 35x14 ft. It has a luminous ceiling, bookshelves along one wall, chairs and tables. Corridors in the towers have plaster walls, linoleum-covered floors, recessed incandescent lighting.

Steam for heating is brought from a central plant to the top of the buildings. There, it passes through heat exchangers to heat the water for the convectors. Supply and return risers are located outside the structures.

• **Eating areas**—Each dining hall contains four 50x48-ft dining rooms. They serve food cafeteria style in the morning and at noon, provide restaurant service in the evening. Folding partitions can divide the rooms in half. Ceilings, following the double curvature of the roof, are surfaced with acoustic tile covered with copper screening. Parallel wood

Dormitories

strips are set at close intervals underneath for visual effect. Lighting is incandescent, in suspended cylindrical fixtures. Mechanical equipment for ventilation is located in the basement.

Kitchen and serving lines on the ground floor occupy 77x74 ft. This part of the kitchen contains steam tables and other finishing units. Rough preparation is done in a basement kitchen and hoisted in freight elevators or dumbwaiters. Dirty dishes are returned by conveyor to the basement.

All buildings in each quadrangle are connected with covered walkways. Construction cost was $7.6 million ($19 per sq ft, $4,500 per bed)—with landscaping and furnishing $10.3 million. Warnecke & Warnecke of San Francisco, were the architects. Norma Willer was project architect for the university.

2. Low-Rise Dormitories

The arrangement of facilities in the University of California residence halls is not greatly different from that being adopted by many colleges and universities for low-rise buildings. For example, four men's dormitories built for Brandeis University, Waltham, Mass., are four stories high and arranged in a quadrangle. Each building houses 100 students, in single, double and triple-occupancy rooms, counselors and headmaster. Each has its own recreation room, kitchen and laundry. Every floor has one lavatory-shower room. Construction is reinforced concrete, the exterior brick, partitions concrete block, ceilings acoustic tile and flooring vinyl-asbestos. Harrison & Abramovitz of New York were the architects.

Two dormitories, one for men, the other for women, built for Ohio Northern University, at Ada, are three stories high. The men's dormitory, of flat-plate concrete wall-bearing construction, houses 170 men, mostly in double rooms. Exterior and corridor walls are brick; partitions are metal studs and plaster, with acoustic insulation. Floors in rooms are asphalt tile and in corridors and lounges, vinyl. Windows are double-hung aluminum. Cost was $537,000 ($3,160 per bed, $16.26 per sq ft).

The women's dormitory houses 86 students in 43 double rooms. Construction details are the same as for the men's dormitory, except ceilings in rooms are painted concrete, acoustic tile

DORMITORIES are being built economically to house large numbers of students.

LAVATORIES are for groups.

ROOMS usually accommodate two.

DINING HALLS are incorporated in the residential cluster.

. . . Designers seek lower-cost construction

being used only in corridors, lobby and lounges. Cost was $338,000 ($3,950 per bed, $14.38 per sq ft). Britsch, Macelwane & Associates, Toledo, were the architects.

3. Layered Houses

The new dormitories for the University of Chicago will depart from the common arrangement of rooms on opposite sides of a central corridor in a narrow rectangular building. The project calls for twin towers, 102 x 78 ft (only one of which will be built initially). They will be separated by, and extend eight stories above, a two-story pavilion containing the entrance lobby and dining facilities.

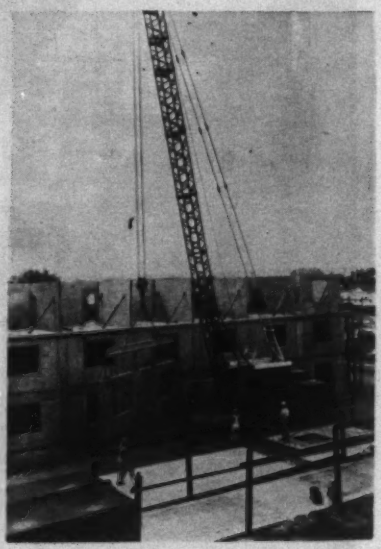
Two-student rooms will be placed around the perimeter of each tower. The interior will be occupied by lounges.

Floors will be paired to form four two-story "houses," each house accommodating 83 students (332 to a tower). Every house will have a central two-story-high lounge. Elevators will use the skip-stop system, halting only at lounge levels.

The towers will have 6-in. flat-slab concrete floors supported on 6-in. concrete bearing walls. Walls are cavity construction—limestone facing for the bay window of each room, brick facing elsewhere; 2-in. foamed plastic insulation; 4-in. concrete block and ¾-in. plaster. The roof over the pavilion will be a series of 3-in. concrete hyperbolic-paraboloids. Cost will be $1.9 million $18.70 per sq ft). Harry Weese Associates, Chicago, are the architects.

4. Duplex Suites

New residential facilities for Harvard University, Cambridge, Mass., represent an even sharper break in room arrangement from those described, because of the departure from single-floor suites. Residents of a seven-story addition to Quincy House are divided into groups of four, and each group shares a two-story suite. It consists of four single bedrooms with a bathroom on one level and a common sitting room on another level. One floor of every three is devoted entirely to sitting rooms. Elevators stop only at those levels and corridors down the center of the building lead to sitting-room entrances on opposite sides. From the sitting rooms, students go up or down one flight of stairs to the bedrooms. Thus, corridors are eliminated from two out of three floors. The seven-story building houses 250 students. It is flat-plate reinforced concrete construction, with brick and glass exterior and concrete block partitions.



PRECAST DORM goes up at Walla Walla.

A dining hall and a library are located in a separate two-story wing with a folded-plate concrete roof. Shepley, Bulfinch, Richardson & Abbott of Boston, were the architects.

They also designed Harvard's newest residence halls, an extension of Leverett House—but a distinct break with the low buildings of the past. The addition, now under construction, consists of two 12-story concrete towers, for 280 undergraduates above the freshmen level.

In these buildings, a typical floor will provide quarters for 14 or 16 students. Four or five of these men will share a common sitting room and bath. Elevators will be skip-stop, halting only at odd-numbered floors.

5. Rehousing Fraternities

An unusual solution to the housing problem is being adopted by Stanford University, Palo Alto, Calif. Fraternities there, faced with a serious financial problem because of the obsolescence of existing fraternity houses and the high cost of modernization or replacement, asked for the university's help. Fraternity and university leaders, after study of the problem together, arrived at these decisions:

Existing fraternity houses are to be abandoned over a period of years as new university-owned houses are built. New houses, one and two stories high, will be arranged in clusters of four, served by a central kitchen. Stanford will invest endowment funds up to one-half the total estimated cost of $300,000 per house, provided the other half is made available from gifts. Construction will begin on new clusters as gift funds become available. A formula under which fraternities will be compensated for existing houses as they move into new housing will be worked out. Warnecke & Warnecke of San Francisco are the architects.

6. Search for Low-Cost Framing

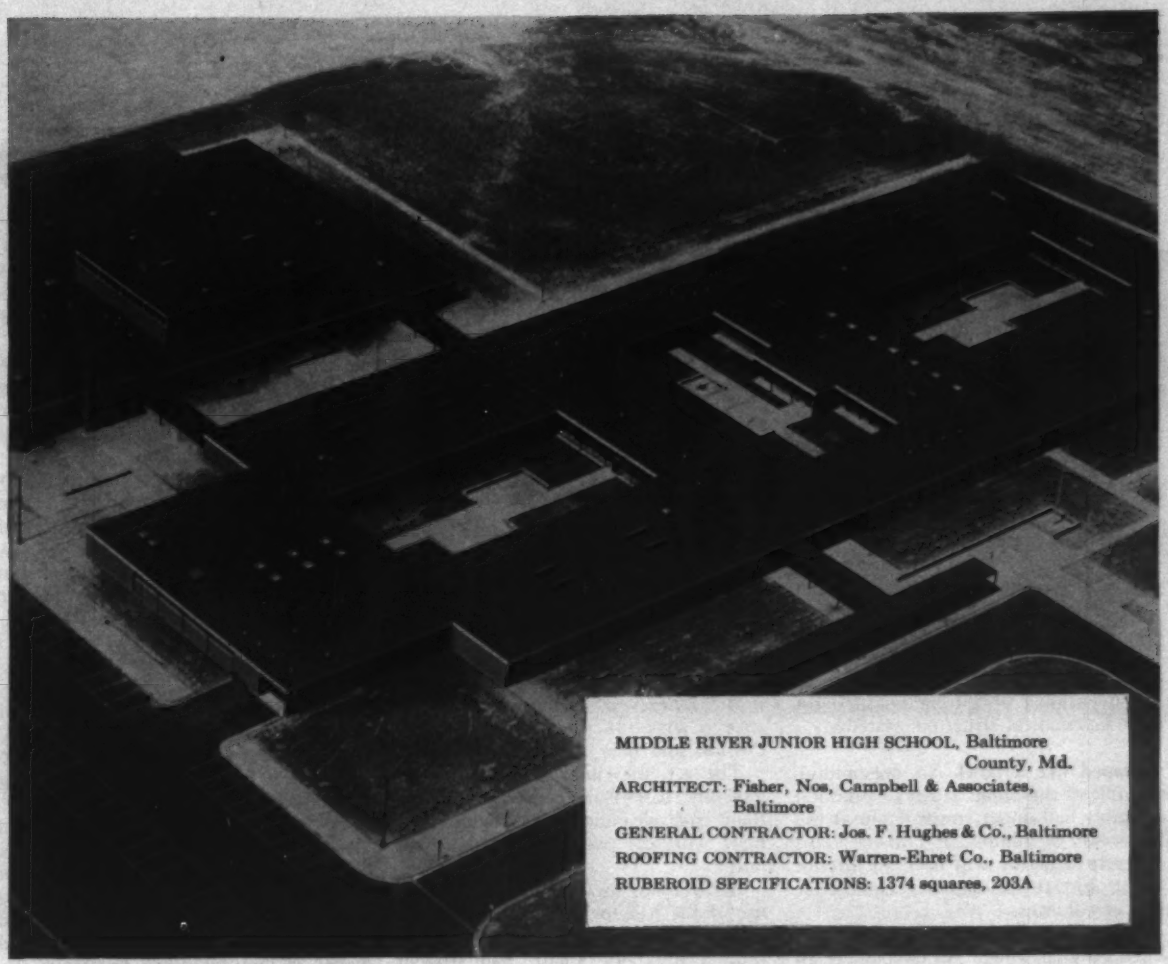
Nolen & Swinburne, Philadelphia architects, are calling for steel framing for Temple University's new men's dormitory. Columns and girders in the 11-story, 138 x 62-ft building will be rolled sections, while floor and roof members will be open-web joists. The exterior will be precast concrete sandwich panels, with horizontal aluminum extrusions between, and aluminum double-hung windows, with porcelain-enameled panels from floor to sill. Cost will be $2.3 million ($5,150 per bed, $22 per sq ft), including dining facilities for 300 and ground-floor recreation areas.

Freeman, French, Freeman, architects, Burlington, Vt., selected lift-slab construction for the four-story men's dormitory being constructed for the University of Vermont, at Burlington. Reason: Faster completion at no extra cost.

The concrete roof and floor slabs, cast one on top of the other at ground level, will be raised by jacks atop structural steel columns spaced about 24 ft apart. The exterior will be brick and porcelain-enameled panels with cinder-concrete block backup; partitions will be cinder-concrete block. Two wings of the building are a little under 300 ft long and 41 ft wide; dining facilities are in a separate wing. Cost of the building is $2.5 million.

A four-story, 56-room wing being added to an existing dormitory at Walla Walla College, College Place, Wash., is of precast-concrete wall-bearing construction. The 6-in.-thick exterior and interior wall panels were fabricated on a casting bed about 25 ft from the building and lifted into place with a 25-ton crane equipped with an 80-ft boom. Forms for the cast-in-place floors and roof were 2-in.-thick wood-fiber-concrete plank, which were left in position permanently to serve as acoustic ceilings. The facades will be finished with a brick veneer. Charles W. Harter, instructor of engineering at Walla Walla, was the structural engineer for the $175,000 project.

It can be seen from this survey that architects and engineers are searching for an economical solution to the problem of housing students at colleges and universities in a way that meets educational objectives. And so far, it appears that all solutions represent a compromise.



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Roofed Athletic Centers

With increasing enrollments at colleges and universities, expansion of facilities for physical education and recreation has become a necessity. As one result, athletic buildings are getting bigger and bigger. And they have to provide for an ever-increasing variety of activities—concerts and lectures, for example, in addition to basketball, track, swimming and other sport exhibitions.

The current popularity of basketball has led to construction of gymnasiums surrounded by stands that rival them in size. These large buildings have had a significant effect on architecture and structural design. The enormous floor areas, unobstructed by structural members, make long-span framing necessary, and the higher construction costs for the longer spans is stimulating use of unconventional designs in a search for more economical structural systems.

• **Shaped like a bowl**—An outstanding example of this trend is the $7.8-million assembly hall under construction at the University of Illinois, at Urbana. This concrete structure will have an interior about 400 ft in diameter completely free of columns.

The assembly hall will resemble a huge covered bowl. At its base is an approximately elliptical activities floor with 118-ft and 140-ft axes. Circular stands slope upward and outward from the arena to a height of 66 ft, about 200 ft from the center of the building. Along the circumference at this level is a prestressed concrete ring girder, which supports the 400-ft-dia circular dome roof. The dome rises 62 ft above the girder, 128 ft above the floor.

A deep depression was scooped out of the ground to receive the bowl bottom. Thus, the activities floor, and about 30 ft of the lower portion of the stands rest directly on the ground. The cantilevered concrete upper stands are stiffened and supported by 43 tapered ribs, which bridge a mechanical trench to carry the load to a continuous ring footing 235 ft in diameter. The thin-shell concrete dome atop the stands is stiffened by undulations in its surface.

A glass-and-steel enclosed concourse, 30 ft wide and 1,100 ft long, will encircle the hall at ground level. With many points of access to the interior, it will relieve congestion when attendance is large. It also can be used for exhibits and fairs.

The activities floor accommodates a 94x50-ft basketball court with more than 10-ft clearance on all sides. The bowl will seat over 17,000 basketball fans.

A curtaining arrangement will permit use of the hall for theater, concerts, or ballet. For such purposes, seating is limited to about 4,000. For student convocations, commencement exercises or lectures, seating capacity can be increased to 19,000.

Offices of the building management, a dining area, ticket offices, public rooms and concessions are located below the concourse. A tunnel connects the activities floor with a level below the offices that has space for team lockers, showers, storage, TV studio, and dressing rooms for theatrical performers.

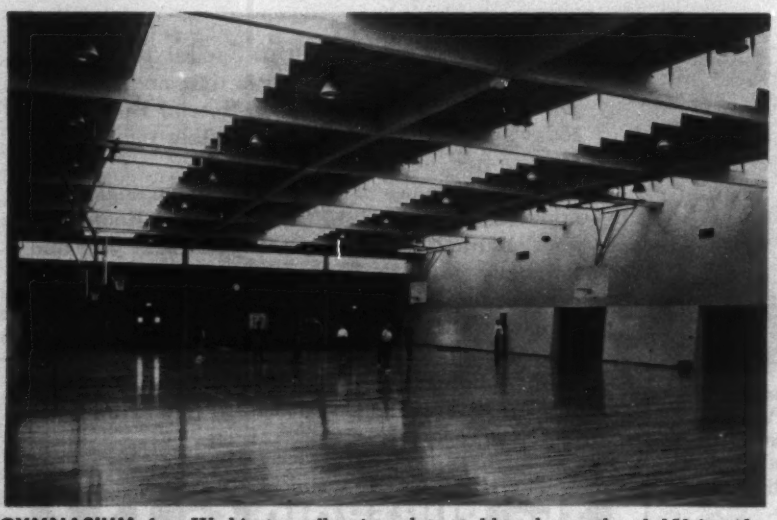
The arena will be lighted with mercury vapor lamps. Fluorescent lamps will be used for general illumination. Fixtures will be mounted on catwalks suspended from the dome.

Funds for the building were raised by issuing bonds, which will be repaid from building income and increased student fees. Harrison and Abramovitz of New York City are the architects. Ammann and Whitney of New York City are the structural engineers.

• **Skew-framed dome**—A similar structure, but on a much smaller scale, is being considered for a $1.5-million field house by the University of Houston. Present plans visualize a circular building 170 ft in diameter with a seating capacity of 8,000.

A skewed-framed structural steel dome will span between the outer walls, keeping the interior completely free of columns. The dome will be supported on a ring of concrete columns around the circumference of the building, and panes of gray glass will be set in aluminum frames between the columns.

The basketball court will be set 15 ft below normal ground level. The base of the dome, which will have a rise of 53 ft, will be 12 ft above grade and 27 ft above the court.

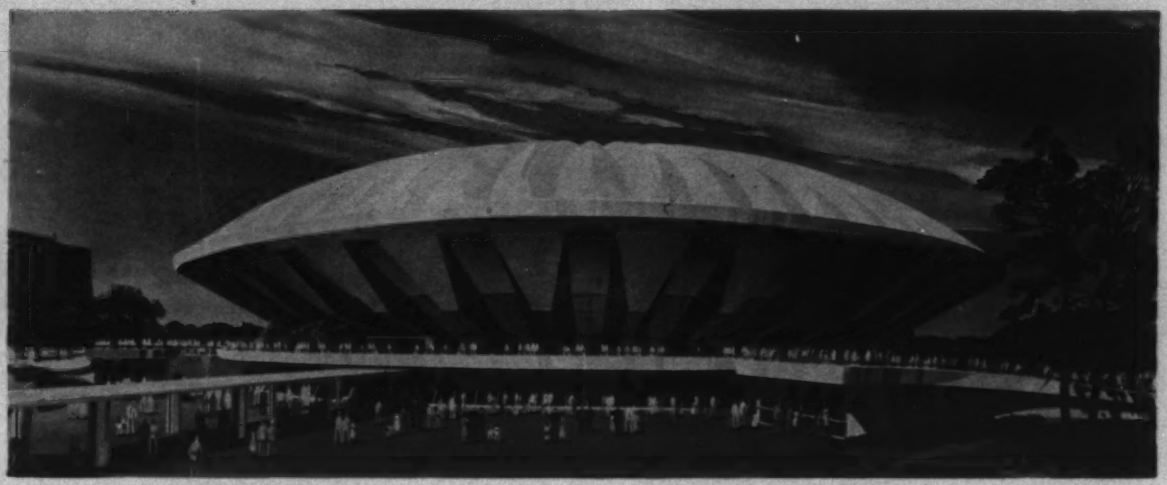


GYMNASIUM for a Washington college is unobstructed by columns, though 150 ft. wide.

• **Suspended roof**—Another example of an unusual structural system is the one adopted for a health and physical education building for Central Washington College of Education, Ellensburg, Wash. The roof of the 150x390-ft building is supported on cables to eliminate interior columns. Cables and their supporting pylons and anchors are completely outside the structure.

"By reversing the usual trend and dramatically showing structure on the exterior of the building, a number of advantages occurred," says architect Ralph Burkhard, of Seattle. "Architecturally, an interesting esthetic solution to what could be called a 'barn'; from a practical point of view, the enclosure of the net space required for athletic uses. This structural system eliminated extra-high exterior walls and the heating and lighting of 40% more space, which comes with truss or arch solu-

Are Getting Bigger



BASKETBALL BOWL being built for the University of Illinois has a concrete dome roof spanning 400 ft.

tions. It enabled control of temperature in the resulting space to be much more easily accomplished. It encouraged the use of controlled daylight through skylights, and it eliminated the creation of a huge cavern."

The 4-in.-thick wood roof deck is supported at a minimum height of 35 ft above the main floor by 14 suspended girders. Of glued-laminated construction, the timber girders are 11 x 26 in. in cross section. They span the 150-ft width of the building, supported at the ends on precast concrete columns and at three interior points by cables. Prestressed concrete purlins—chosen instead of wood to increase dead load, to counteract uplift from wind—span between the girders at 18-ft intervals.

The cables are 1 5/16-in.-dia bridge strands. They pass over the tops of 80-ft-high concrete pylons and extend to 420-ft-long concrete anchors buried 12 ft underground. To reduce wind-induced vibrations, wind spoilers were provided over the skylights, and special clamps were installed on the backstays. The strands are used in pairs, and each pylon carries two pairs.

The 80-ft-high pylons, spaced 30 ft c-c, are tilted away from the building. They were prestressed to offset stresses induced by the tilt. Hollow rectangular sections 4 in. thick, they vary in size from 30 in. square at the middle to 12 in. at the ends.

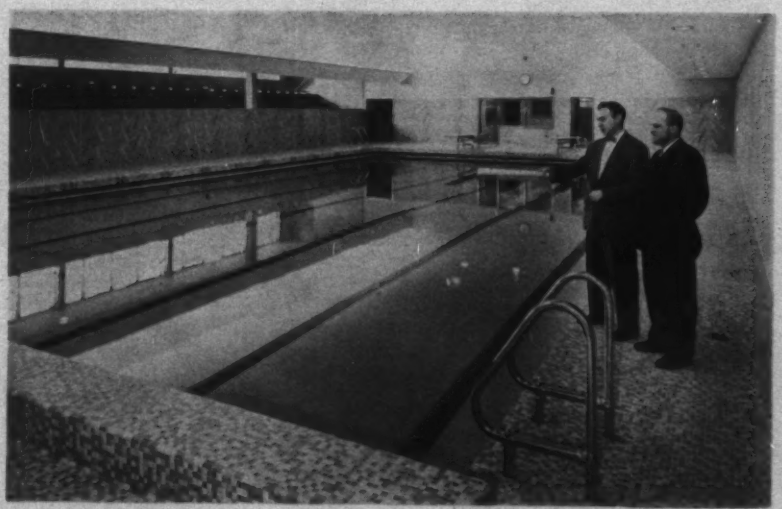
Each pylon was cast in two channel-shaped halves, with ducts incorporated for post-tensioning tendons. The halves were joined in a special jig by casting a 4-in.-thick diaphragm between the channel flanges.

Each cast-steel cable saddle was welded to a steel-plate box, which was galvanized and welded to steel embedded in a pylon. The box then was filled with concrete to complete the capping of the pylon.

A seat for the pylon was formed with a steel bearing plate containing a center pin. A lead pad of predetermined hardness was placed between the bearing plate and the pylon to control the bearing pressure and allow for rotation.

• **Multi-activity structure**—The building, which is enclosed with precast concrete walls, is divided longitudinally into three sections. It has a 120x150-ft main gymnasium at one end separated from a 150-ft-square field house at the other end by a two-story section. This central portion contains on the first floor separate shower and locker facilities for men and women and on the second floor a 150x80-ft gymnasium, a 40x60-ft apparatus room, two four-wall handball courts, and four classrooms. A natatorium is in a separate wing.

The field house, with an oil-treated



TYPICAL SWIMMING POOL—Case Institute's—is tile lined, has stands.

. . . How to get longer spans at less cost?

STEEL CABLES support 150-ft timber girders spanning the physical education building of Central Washington College.

earth floor, can be used for indoor practice of activities that would normally be outdoor—baseball, softball, football, track and field hockey. Suspended, retractable nets will be installed for golf and archery.

Gymnasium floors are resilient maple on crisscross underlayment. Air circulates under the floors as part of the overall heating system. Lighting is mercury vapor.

Spaces are acoustically treated—rockwool on expanded metal lath in the gymnasium, sprayed asbestos on the concrete folded plates over the swimming pool and over the front lobby, and acoustic tile in the classrooms. End walls of the main gymnasium, field house and swimming pool are zigzagged both for acoustical purposes and for structural stability. Skylights are double glazed with plastic and are equipped with electrically operated pressed-wood louvers for light and heat control.

The main gymnasium was planned for varsity competition, an intramural program, and physical-education instructional use. It has been lined for eight badminton courts, six volleyball courts, two regulation-size college basketball courts and four intramural-size basketball courts. The gymnasium is easily converted to these purposes by electrically operating twelve basketball backboards. Electrically operated folding bleachers seat 3,000 spectators on the ground floor around a central court for varsity competition, and additional seats may be added in the upper gymnasium.

The natatorium is 70 x 98 ft and contains a 75x42-ft swimming pool. It has a roll-out type gutter, with skimmer action around the edge. Filters are diatomaceous earth. The pool is kept at constant level by a balancing tank. Equipment includes a one-meter and three-meter diving board.

Cost of the building is $1.4 million ($14.15 per sq ft). Anderson, Birkeland & Anderson, of Tacoma, were consultants on the structural engineering to Ralph Burkhard, the architect.

• **Folded-plate roof**—A $5.5-million physical education building to be constructed for the University of Pittsburgh will have folded-plate concrete roofs spanning about 100 ft. Plans call for an H-shaped building ultimately; but it will be built in three phases. The bar of the H will be a three-story quadrangle with an interior court. One leg of the H will house swimming pools, the other leg gymnasiums and other athletic facilities.

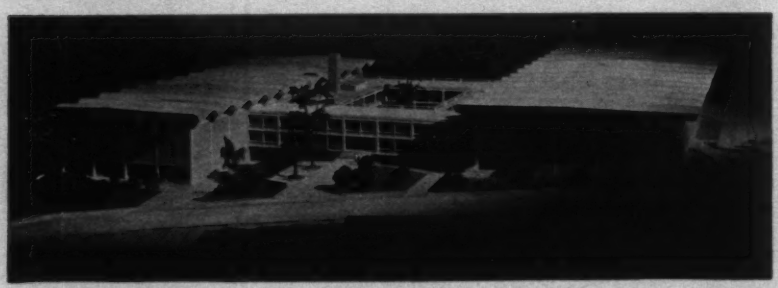
Phase one will be a reinforced concrete natatorium 225 x 100 ft with a 165x75-ft swimming pool. One wall will be glass; the others brick, glazed structural tile and concrete block. Inside will be a seating gallery for 700. Lockers, showers, drying rooms and toilets will be in part of the bar of the H. Equipment for the pool includes a three-meter diving board and five, seven and ten-meter platforms.

General lighting of the pool will be accomplished with clusters of incandescent lamps providing 5,800 w mounted on each of 14 columns. The light will be reflected from the ceiling, about 40 ft above the pool. Underwater lighting and observation windows are provided in the sides of the pool.

Phase two will add a women's swimming pool at the end of this leg of the H, lengthening it 75 ft. In addition to dressing and locker room space, this phase will also incorporate classrooms, teacher training facilities, offices, and squash and handball courts, to complete the 200 x 175 ft quadrangle forming the bar of the H.

Phase three will complete the H, with a 325x125-ft reinforced concrete structure. It will provide men and women's gymnasiums, health and remedial suites, and bowling alleys. It will also have facilities on four levels, including a basement, for wrestling, weight lifting, golf, archery, fencing, and gun practice.

The folded-plate concrete roofs capping both legs of the H will be supported on concrete columns at 25-ft intervals. Deeter & Ritchey of Pittsburgh, are the architects; Gensert and Williams, of Cleveland, Ohio, the structural engineers.



H-SHAPED BUILDING with folded-plate roof will house Pitt's pools and gyms.

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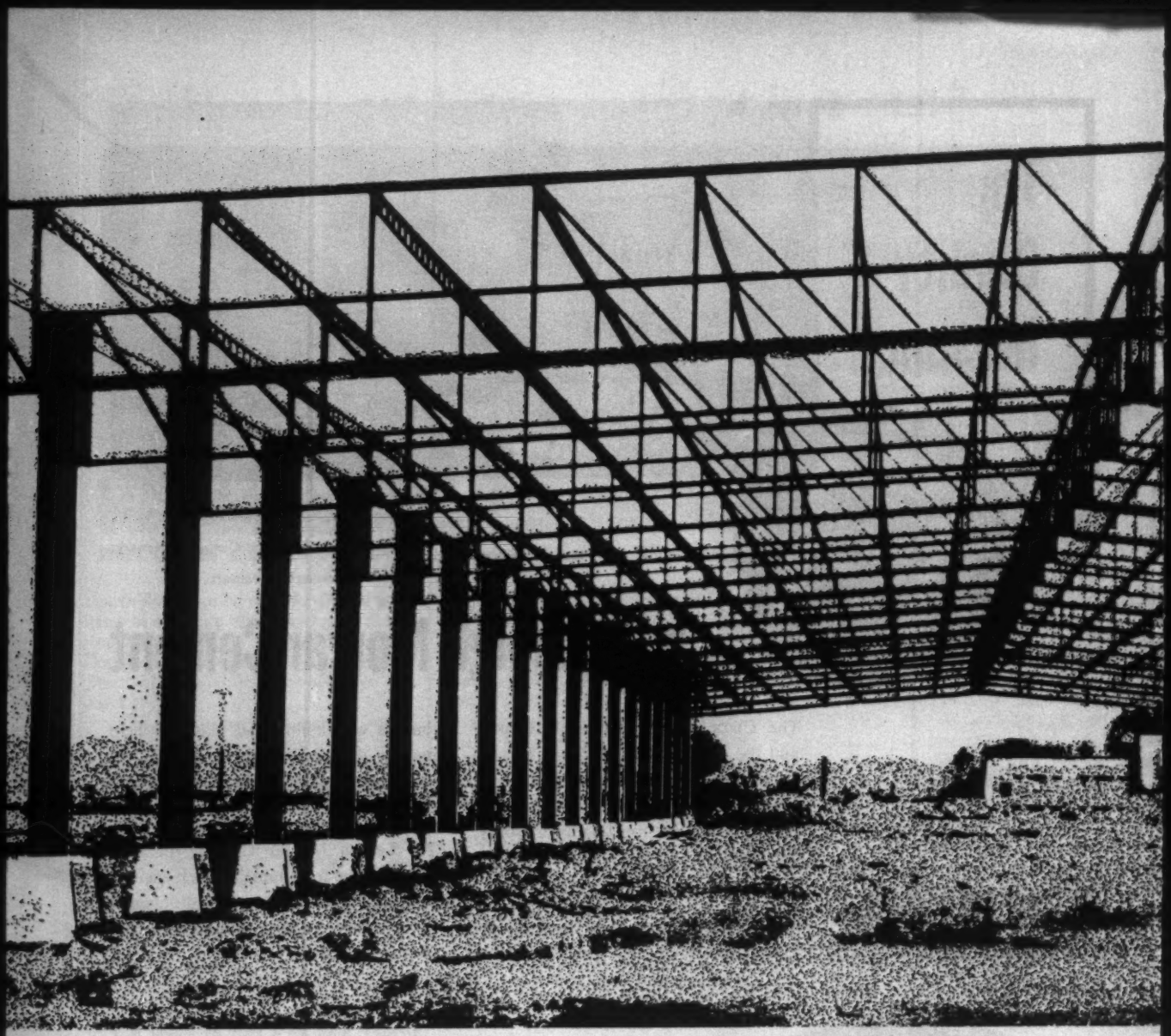

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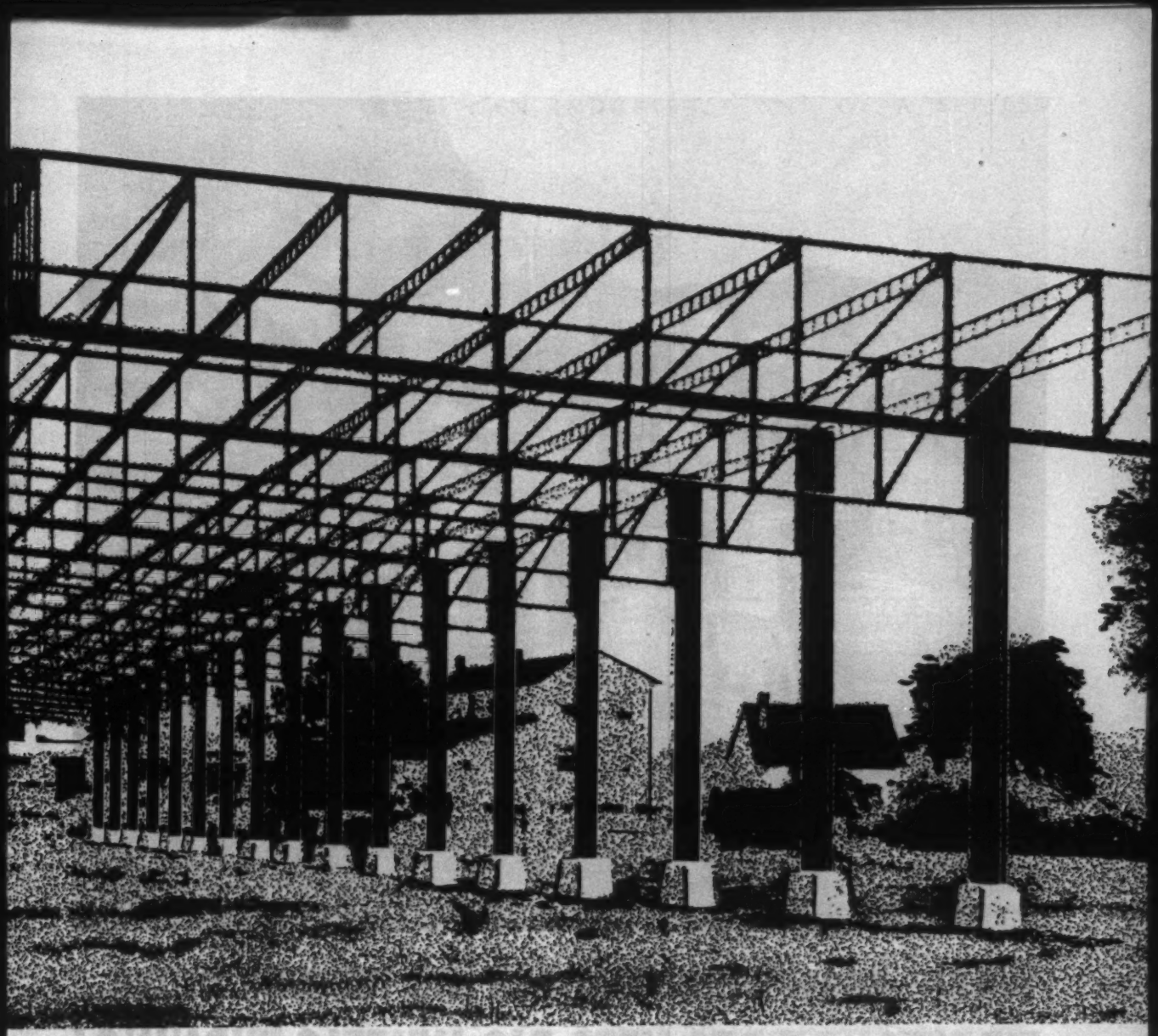

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Employee Gift Matching

Another Good Way To Help Our Colleges And Universities

The business community continues to make an impressive record in giving badly needed financial help to our colleges and universities. This year the Council for Financial Aid to Education expects that business contributions to higher education will be well over four times their total of about $40 million a decade ago.

If these contributions, which were about $150 million last year, continue to increase at the present rate, they will hit the target of $500 million set for business aid to our colleges and universities in 1970. This is the amount which, the Council calculates, must come from business if these institutions are to have the money to do their job properly a decade hence.

However, it would be a fine thing both for the nation and the business community if that $500 million dollar target were hit well before 1970. This would put us ahead of a schedule (it is a conservative schedule) in getting on top of what remains one of the nation's most crucial problems—that of having its colleges and universities adequately financed which they are very far from being right now.

There is, we believe, one quite simple way by which financial support for higher education by business firms might be considerably speeded up. All that is required is that business firms generally abandon the idea that it is possible for every company to have a program to provide such support that is novel and distinctive, and that this is the only way that interests of prestige and good public relations can be served.

There are nowhere near enough good plans to provide financial help for higher education to equip even a small percentage of our business firms with one that is novel and distinctive. Also **there are a number of very good plans which, so far as we can tell, lose nothing of their value for prestige and good public relations by being used by a large number of companies.**

The Gift Matching Idea

One plan with these attractive characteristics is the plan by which companies match the gifts of their employees to colleges and universities, and now increasingly gifts to independent secondary schools. So far as we can discover the general plan was invented by the General Electric Company, with what it calls its Corporate Alumnus Program. Now, with variations on the same basic design, almost 100 companies have gift matching plans. We at McGraw-Hill are included in this number.

The gift matching plans vary considerably in detail. Some are limited to alumni of the schools to be benefited. In others any employee can participate by making a gift to an eligible institution. There are also variations in the maximum amounts of gifts by individuals and to individual institutions which will be matched. Some companies have "open end" plans; others limit the total to be matched in any one year. All of the plans, however, embody the same central gift matching idea.

When the plan was first launched some college administrators of little faith in the fundamental generosity of the alumni and friends of their schools expressed the fear that if gifts were to be matched they might be made smaller in the first place. The opposing view was that the possibility of having them matched would stimulate more and larger gifts.

Advantages Of Gift Matching

So far as we have been able to discover, the expectation that giving would be stimulated by gift matching has been validated by the experience with the plans. This has been our experience at McGraw-Hill. Some other important virtues of the gift matching programs have been summarized by

LEADERS OF SOME OF THE INSTITUTIONS WHICH HAVE SHARED IN THE McGRAW-HILL EMPLOYEE GIFT MATCHING PROGRAM EXPRESS THEIR VIEWS

"We particularly appreciate the fact that your grant is unrestricted, and can therefore be used for our area of greatest continuing need — the General Education Fund, from which faculty salaries come."

W. Boyd Alexander, Vice President and Dean of the Faculty
Antioch College

"We are grateful, not only for the financial support given to The Cooper Union by your company, but also for the stimulus it has provided our alumni in your employ to make annual gifts to their Alma Mater."

Edwin S. Burdell, President
The Cooper Union

"The gift matching program has a dual advantage. First, it acknowledges and repays a debt of honor to those colleges which, often at great loss to themselves, have trained and educated the men who are now among your personnel. This is most fair and equitable. Secondly, by offering to match up to a given limit the contributions of alumni, you encourage support of their own colleges on the part of graduates, who themselves are so indebted."

President Edward B. Bunn, S. J.
Georgetown University

"Thanks to your doubling of the annual gifts of one of our generous and loyal friends who works with you at McGraw-Hill, we are well on the way toward creating what for us will be an extremely helpful scholarship fund. This would not have been possible without the gift matching program."

C. Adrian Heaton, President
California Baptist Theological Seminary

Ernest T. Stewart, Executive Director of the American Alumni Council (1785 Massachusetts Avenue, N.W., Washington, D.C.) who would be glad to provide detailed information about them, and the names of companies having such plans. Of the gift matching idea he says,

> *"First*—it assures the corporation that its gifts go direct to those colleges and universities which have furnished it with trained manpower.
>
> *"Second*—it places responsibilities for the gifts on the institutions themselves and drives home the point that they must make a real effort with their own alumni.
>
> *"Third*—it leaves the final decision of corporate support basically to the employees."

For many companies which are fearful of complicating their relations with their customers by courting charges of favoritism if they provide direct financial support for any particular school or group of schools, this latter consideration can be of decisive importance.

The gift matching plan also has what for many companies is the very important virtue of being simply and easily administered. Some additional virtues of the gift matching plan, as seen by officers of institutions which have been beneficiaries, are indicated in the box at the top of this page.

Effective And Easily Managed

We at McGraw-Hill are well pleased with our gift matching program. It is a broad program in which all employees and a wide array of colleges and universities, both privately and publicly supported, are eligible to participate. We commend it as an effective and easily managed plan to provide urgently needed financial aid to higher education.

We also urge that business firms adopt this or one of a number of other very good programs of financial aid to higher education* rather than delay in the hope of hitting upon some quite new and distinctive plan. There are very long odds that such delay will prove unavailing. In the meantime our colleges will be losing financial help which it is profoundly in the interest of the business community and the nation to see that they get—and get fast.

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*An earlier editorial in this series dealt with tuition supplements as another good way to help our colleges and universities. Reprints of this editorial are available. So are copies of a "more or less socratic dialog," entitled, **A Business Wrestling with the Problem of Aid to Colleges and Universities.** It was prompted by the efforts of McGraw-Hill to find suitable methods of providing financial aid to higher education.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT
McGRAW-HILL PUBLISHING COMPANY, INC.

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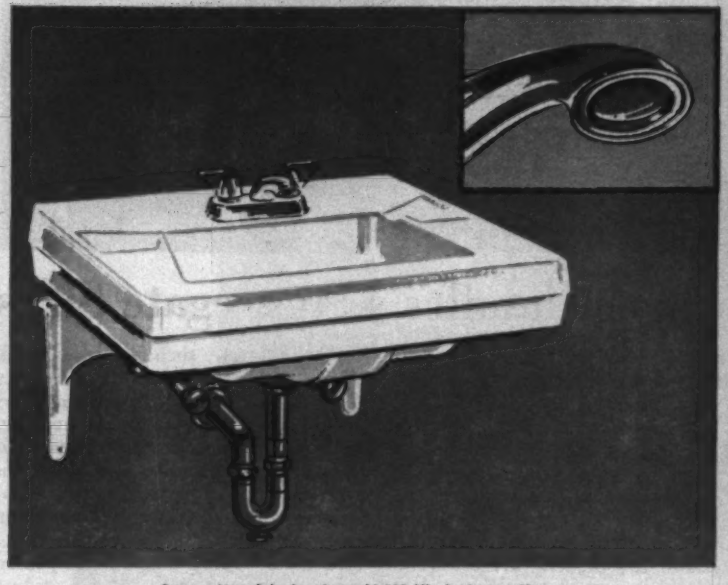
Crane economies of quality



Crane Norwich lavatory (1-160-V) features Neu-Spray fitting (8-572) and exclusive Dial-ese controls.

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New Products

Hopper Handles 4 Aggregate Sizes

Model 405 Charging Hopper and Feeder is designed for use with stationary or portable asphalt plants and is said to be ideal for use where three or four sizes of aggregate are to be fed to the plant.

The Model 405 base units can be converted to a Model 410 Charging Hopper and Feeder by adding 2-ft-high extensions; the capacity of each compartment is increased from 5 cu yd to 10 cu yd, with a 40-cu-yd total struck capacity. Either unit may be driven by electric motor or gas engine.

The units have such features as quick acting lever mechanism to raise gates to remove foreign obstructions and automatically reset to preset opening; four in-line hopper compartments, each with a 5 cu yd capacity to enable accurate separation of aggregates; two 24-in. endless type belt feeders, each serving two compartments; four radial rising type gates with ¼-in. to 8-in. opening range, complete with direct reading gages; and a 30-in. trough-type gathering conveyor. Iowa Manufacturing Co., Cedar Rapids, Iowa.

Portable Hydraulic Power Unit

Designed for field applications where pneumatic or electrical power is not readily available, the Model 905 G power rig is a trailer-mounted, self-contained hydraulic power source.

It consists of a gasoline engine, hydraulic pump, hydraulic reservoir, fluid cooling system and all necessary hydraulic piping and valving mounted as a single compact unit in a rubber-tired trailer chassis. Gasoline capacity permits ten hours of continuous operation.

The unit delivers hydraulic power with an operating pressure up to 5,000 psi. Power source of the unit is an air-cooled four-cycle gasoline engine rated at 5½ hp at governor-controlled 2,900 rpm speed. The power rig itself is a transportable hydraulic generator containing an integral air-cooled self-contained heat exchanger. The cooling system is designed to maintain temperature in the oil reservoir at 16 F. above ambient. Linked with a belt drive, the

engine and pump assembly is mounted on a chassis base which is cushioned through isolation dampers to prevent transmission of vibration to other components through the chassis. The trailer undercarriage is designed for easy removal to permit installation of the power rig itself as a semipermanent installation.

The unit is provided with a 12-volt

HOW TO SAVE TIME, MONEY AND MILES WHEN YOU BUILD A DAM

use a Roebling Conveyor Suspension Bridge

The sole purpose of this 1000-foot span, Roebling designed suspension system is to support an aggregate-carrying conveyor. The site is the Ice Harbor Lock and Dam Project at Pasco, Washington, under construction by Guy F. Atkinson Company.

The problem, and it was a large one, was to get the concrete aggregate from the South side of the river to the North side, without having to truck it some 10 miles around. The tremendous amount of concrete needed for the pouring of the dam's locks fully justified the erection of this structure. The savings in time and labor, and the assurance of an uninterrupted flow of material are additional factors that add to its value.

Of course, you don't have to build a dam before a Roebling conveyor *suspension* system can be of value to you. Your needs may be considerably more modest. You may have an in-plant (or "in-and out-plant") materials handling problem. It may be temporary or permanent.

No matter. Roebling designed and constructed suspension systems of all kinds are easing transportation problems for manufacturers and processors with speed, safety and savings. Don't think for a minute that your problem must be of the above magnitude. On the other hand, your needs may be greater. Either way—to carry your conveyor across the yard, or river, or between mountains—a Roebling suspension system can be the most economical answer. For details about your requirements, just ask Roebling's Bridge Division, Trenton 2, New Jersey.

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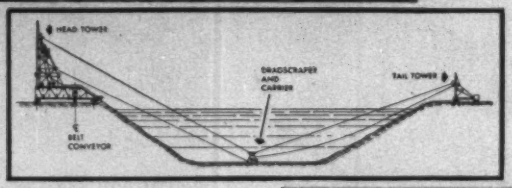
Tough Digging, Long Hauls... Routine Jobs for Sauerman DragScrapers

240-Ft. Bank... 350-Ft. Haul

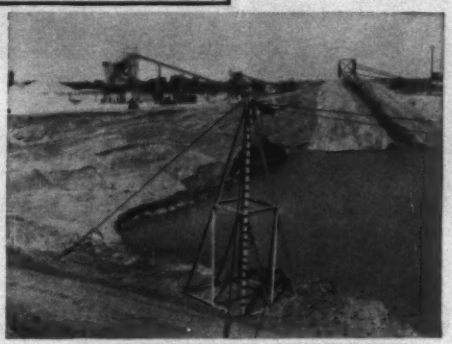
This mobile Sauerman Tower Excavator digs 480 yds. per hr. on an average haul of 350 ft. from a high bank to a portable field hopper. The 12-yd. Crescent DragScraper operates between steel head and tail towers. The towers are mounted on two sets of railroad tracks and ride on four sets of trucks. DragScraper power is supplied by two hoists mounted on the head tower. One hoist operates the load and pull-back cables, the other is used to tension the track cable. The hoists are controlled by one operator located in the cab on the tower. The load cable handles over 400,000 tons of material before replacement.



Drawing shows typical mobile tower excavator digging in wet pit.

75 Ft. Under Water... 800-Ft. Span

A 5-yd. rapid-shifting DragScraper supplies about 200 yds. per hr. to the plant hopper in background. Bridle tower in foreground is one of two supporting the bridle shifting cable which is controlled by the third drum of the Sauerman hoist. Lateral shifting of the DragScraper's line of operation is readily accomplished by power-shifting the trolley and tail block to a new position on the bridle cable. The DragScraper is digging 75 ft. under water and the operating span is 800 ft. from head frame to the bridle towers. Over a million tons have been excavated from this pit. The DragScraper often operates 24 hrs. a day to handle contract demands.



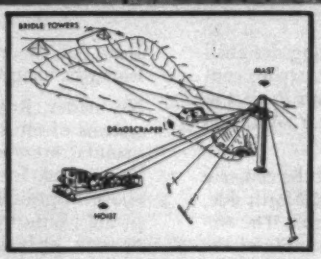


Diagram shows details of Sauerman rapid-shifting DragScraper.

Sauerman machines dig and haul in one continuous operation... work on high bank, dry pit or under water... handle most bulk materials. Consult Sauerman engineers about your job. We will promptly supply appropriate literature.

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. . . New Products

battery-operated electric starting system. A belt-driven generator operating from the engine keeps the battery charged. Electric starting is practical because the system's "hydraulic fuse" design permits starting the engine under no load conditions.

When the engine is not running, the hydraulic valving system shifts to idle the hydraulic system, disconnecting the lockup that converts the engine's mechanical input to hydraulic output.

Once the engine has been started and the pump brought up to a speed that will deliver the required volume for normal operation, the valving automatically shifts to close the hydraulic fuse for delivery of full hydraulic power.

Controls and tool box are mounted at the rear of the unit; 50 ft of hose is provided with the model. Additional lengths up to 300 ft can be used without serious loss operating efficiency. HUCK MFG. CO., 2480 BELLEVUE AVE., DETROIT 7, MICH.

Tough Epoxy Resin Coating Is Easy to Apply to Pipes

A pipe coating that remains continuous, even after the pipe is dented by repeated pounding, is easy to apply, says the manufacturer.

The coating material is an epoxy resin that cures in less than 20 seconds with close coating tolerances. Solvent hazards and post-baking, normally associated with epoxies, are eliminated, the maker claims.

The new coating brings the physical and electrical properties of epoxies to the corrosion field at a competitive price.

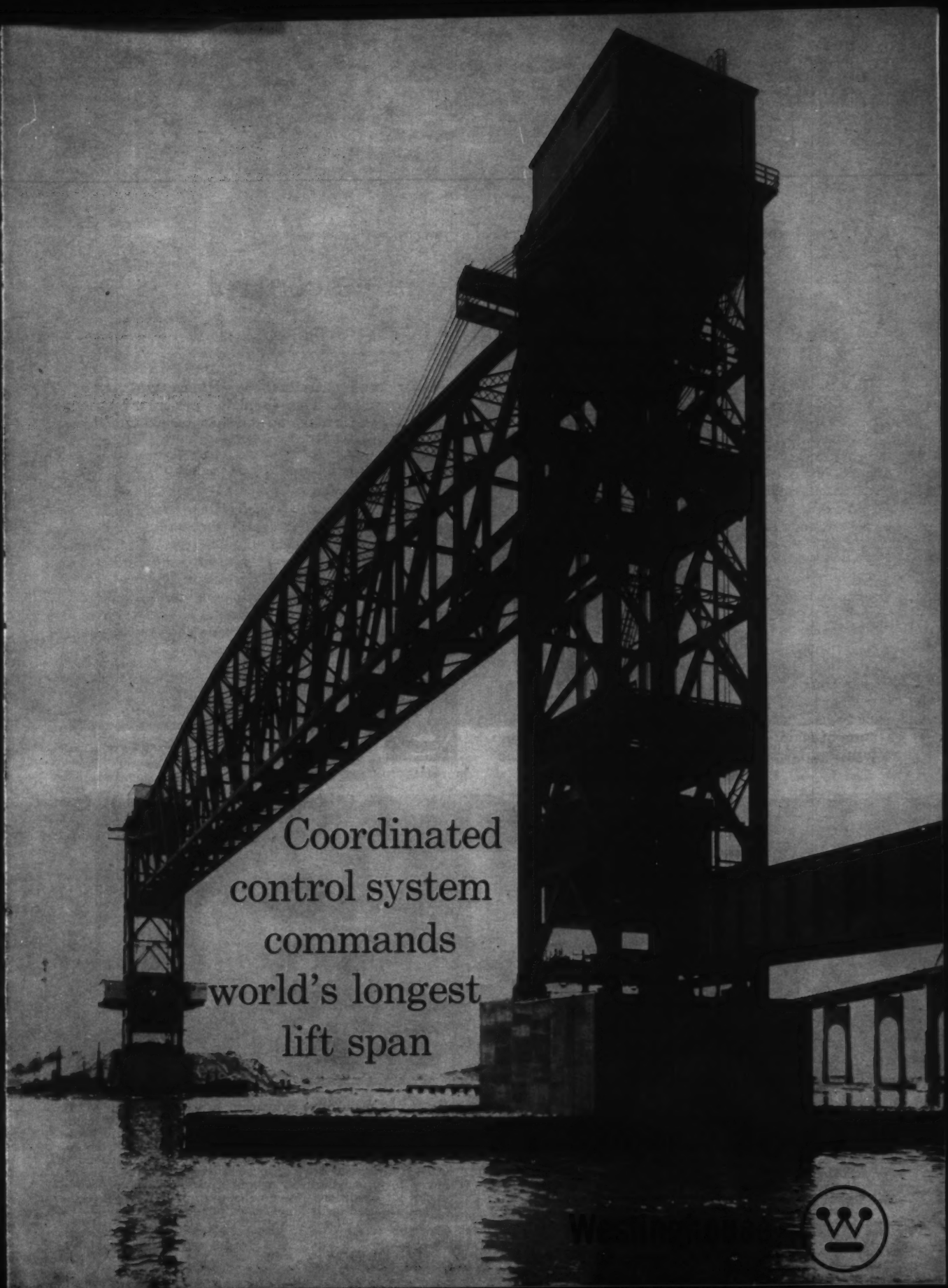
Pipe coated with the resin has been handled in much the same way as bare pipe in field trials. In addition, welding of pipe sections can be accomplished through the resin coating, once an arc has been struck on a bared spot.

The resin will not flow under pressure or upon heating. Adhesion strength of the material is 3,000 psi. It has high impact strength to resist damage from soil or pipe movement and the abrasion and shock of backfilling.

Called "Scotchkote" 101, the material resists attack by most chemicals, including hydrocarbons such as fuel oil, gasoline, kerosene and sweet or sour crude.

A typical electrical resistance value of a 10-mil coating of the material is 10,000 megohms per sq ft.

The coating can also be applied to fittings, meter brackets, transformer cases, beams, supports and other related objects. MINNESOTA MINING & MANUFACTURING CO., ST. PAUL, MINN.


Coordinated
control system
commands
world's longest
lift span

ON COVER: The Arthur Kill Lift Bridge between Staten Island, N. Y., and Elizabeth, N. J., was designed by Parsons, Brinckerhoff, Quade & Douglas for The Staten Island Rapid Transit Railway Company (a wholly owned subsidiary of The Baltimore and Ohio Railroad Company) and built by American Bridge Division of the United States Steel Corporation. 1645 feet long over-all, the bridge is shown with its 558-foot central span in raised position.

Westinghouse electrical system gives precise, reliable control over vertical lift of 2,000-ton span

The new Arthur Kill Bridge boasts the longest vertical lift span ever constructed. The record length span replaces an old swing bridge whose center pier had become a navigational hazard. Westinghouse equipment quickly and smoothly elevates the span 104 feet to leave a 500-foot-wide clear navigation channel for the passage of ships—lowers the span for rail traffic.

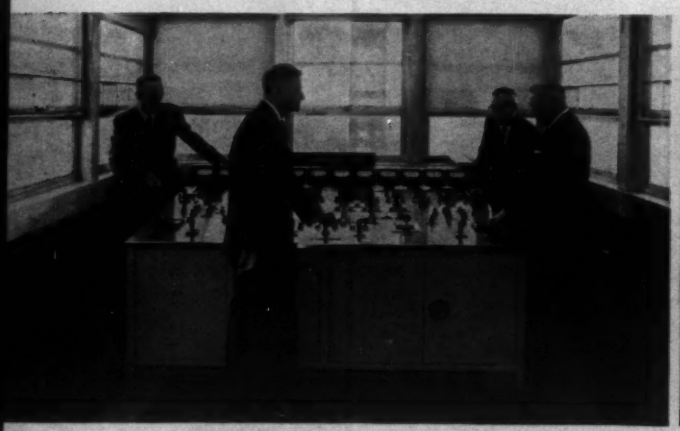
Suspended between two shore towers, the counterweighted main span is operated by giant cable sheaves driven through reduction gearing. Measuring 558 feet in length and weighing four million pounds, it can be raised or lowered through its 104-foot travel in approximately two minutes. The d-c adjustable voltage drive, furnished by Westinghouse, gives precision speed control and holds skew of the span to a minimum throughout the normal operation cycle.

Smooth acceleration to maximum speed and gentle controlled retardation to stop give the bridge every assurance of a long and useful life with a minimum of maintenance. Standardized d-c mill motors furnish drive power for span operation. Heart of the precision speed control is the Westinghouse Magamp exciter regulator. This simplified design uses the completely static Magamp and a single field rotating exciter to provide top performance with extremely low maintenance.

Drives in each tower are synchronized by a sensitive skew detection scheme which uses static elements to automatically reduce voltage to the leading motor and increase voltage to the trailing motor. This system can be expected to keep the two ends of the lift span within close limits of being perfectly level throughout its travel. To assure bridge operation under emergency conditions, a stand-by diesel engine generator set is installed. A duplicate drive system is also provided and is available at the option of the bridge operator at any time. *(cont'd)*

J-94150-2

Westinghouse



View of main control room in east tower, showing desk from which operator controls all main and auxiliary bridge drives. Special instrumentation, including height and skew indicators, keeps bridge tender informed of all operating conditions. Drive system transfer and power source selection is made from this console. W. C. Carl explains conveniently grouped controls to N. L. Ziegler, Division Engineer (left); J. F. Stevens, Superintendent; and P. K. Partee, General Manager.

Discussing main drive equipment in east tower are M. B. Trimble, Westinghouse Construction Engineer; G. R. Keltie and W. C. Carl. Two type MCPA-614, 135-hp Westinghouse mill motors are shown above—one motor for each of the duplicate drive systems. Systems are arranged so that one motor in each tower can drive span at rated speed. These rugged, heavy-duty, standardized motors assure reliable operation under all conditions. Westinghouse type HI-198 thrustor brakes are used for holding bridge at standstill.

G. R. Keltie, Chief Substation Maintainer, The Staten Island Rapid Transit Railway Company, looks on as W. C. Carl, Westinghouse Construction Engineer, points out details of main d-c control panel. This panel contains type M, 800-amp d-c "loop" contactors, span speed, current limit and skew control Magamps with associated auxiliaries.

Incoming 4160-volt power is reduced to 480 volts by this 500-kva Westinghouse power center. Low-voltage switchgear at rear distributes power to main drive system and bridge electrical auxiliaries. Type DB drawout air circuit breakers provide feeder circuit protection. Discussing installation: John Pucillo, Staten Island Rapid Transit Railway Electrician; Max Pilger, Garfunkel Electric Supply Company; and M. Davis, Westinghouse Sales Supervisor.

John Pucillo is seen operating wall mounted AB-I breaker which controls machinery and room heaters. In foreground, main 125-kw type SK d-c adjustable voltage generator driven by 150-hp type CSP* motor. Generator excitation furnished by Magamp exciter regulator determines operating speed of main drive motors. Small unit at near end is a constant potential generator for drive motor fields and control auxiliaries. The d-c supply for duplicate drive system is furnished by identical equipment.

*Trade-Mark

A Westinghouse control center in the east tower switchboard room is examined by Messrs. Partee, Carl and Ziegler. It contains combination starters for 440-volt auxiliary drives and includes a-c relay panels at each end. Compact control centers are composed of interchangeable, space-saving, easily installed modular units.

J-94150-3

Coordinated control system commands world's longest lift span *(cont'd)*

As supplier of the coordinated electrical systems, Westinghouse assumed complete responsibility for their performance. For more information about how this single-source supply can benefit you, contact your nearby Westinghouse construction sales engineer. Or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

OWNER: The Staten Island Rapid Transit Railway Company (a wholly owned subsidiary of The Baltimore and Ohio Railroad Company), Staten Island, N. Y.
CONSULTING ENGINEER: Parsons, Brinckerhoff, Quade & Douglas, New York, N. Y.
GENERAL CONTRACTOR: American Bridge Division, United States Steel Corp., Pittsburgh, Pa.
ELECTRICAL CONTRACTORS: Fischbach and Moore, New York, N. Y.
Lightning Electric Service Co., Newark, N. J.
WESTINGHOUSE DISTRIBUTOR: Garfunkel Electrical Supply Co., Jersey City, N. J.

J-94150-4

Westinghouse

Interesting view from mezzanine floor, showing one of four span control auxiliary assemblies. A single machinery take-off to the multiple speed gearbox provides correct ratios to operate type A cam limit switches, height, skew and control transmitters. This construction permitted unit preassembly at machinery builder's plant—assuring fast, easy installation. Seen above: W. C. Carl and G. R. Keltie.

Freight train moving over the recently completed Arthur Kill Lift Bridge is drawn by a diesel engine of The Staten Island Rapid Transit Railway Company.

'Dig-by-Itself' Trencher Makes Ditch-Digging Easy

A trencher with a "dig-by-itself" feature has been designed for jobs too small for economical use of conventional equipment. The self-powered, self-propelled, portable trencher digs a 2-in. to 3-in. ditch 3 ft deep or a 4-in. ditch 18 in. in depth.

Positively driven by a simple six-speed winch mechanism, the equipment draws itself along the desired line of the ditch. The user drives a stake at the terminal point, hooks on the winch line, and starts the rig working. Davis Manufacturing Inc., 1500 McLean Blvd., Wichita, Kan.

Chain Hoist Moves Load Rapidly and Easily

Lightweight aluminum chain hoists, ranging from ½-ton to 10-ton capacity, are available in seven models. Weight of the ½-ton model is only 26½ lb.

Main feature of all models of the Reading Hoist is a noiseless load brake which permits fast, easy load lowering.

Other features are a light hand chain pull and a load chain guide around the load wheel. The guide prevents the load chain from binding regardless of the pulling angle.

All operating parts are totally enclosed in a shock-resistant aluminum housing. Reading Crane & Hoist Corp., Reading, Pa.

Automatic Idling Device Lifts Engine Efficiency

Two electric generating plants have an automatic idling device that, its maker says, increases engine life and decreases fuel consumption.

The device maintains a no-load speed of approximately 2,000 rpm on the 2,500 watt and 3,500 watt engines.

When a load is placed on the line the unit compensates by increasing engine speed to the required 3,600 rpm. Pioneer Gen-E-Motor Corp., 5841 West Dickens Ave., Chicago 39, Ill.

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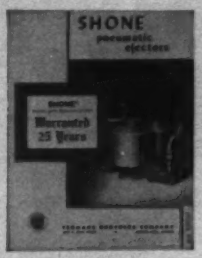

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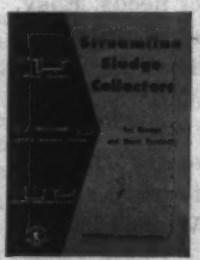
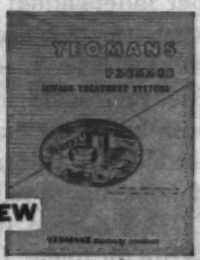


STREAMLINE Sludge Collectors, Conveyor Type, **No. 6751**



PACKAGE Sewage Treatment Systems, **No. 6770**

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Walter G. Schulz

California Water Group Losing Second Key Man

Private enterprise has again raided California's Department of Water Resources. Last month it got Deputy Director Ralph Brody (ENR Aug. 4, p. 24). This time it carried off Walter G. Schulz, chief of the design and construction division.

Both men have declared that they are not deserting the state because of the controversy over the state's proposed water plan.

"For the past five years I have considered a number of fine opportunities to enter private engineering practice," Mr. Schulz said, "but in each case I decided to stay with the state's water development program."

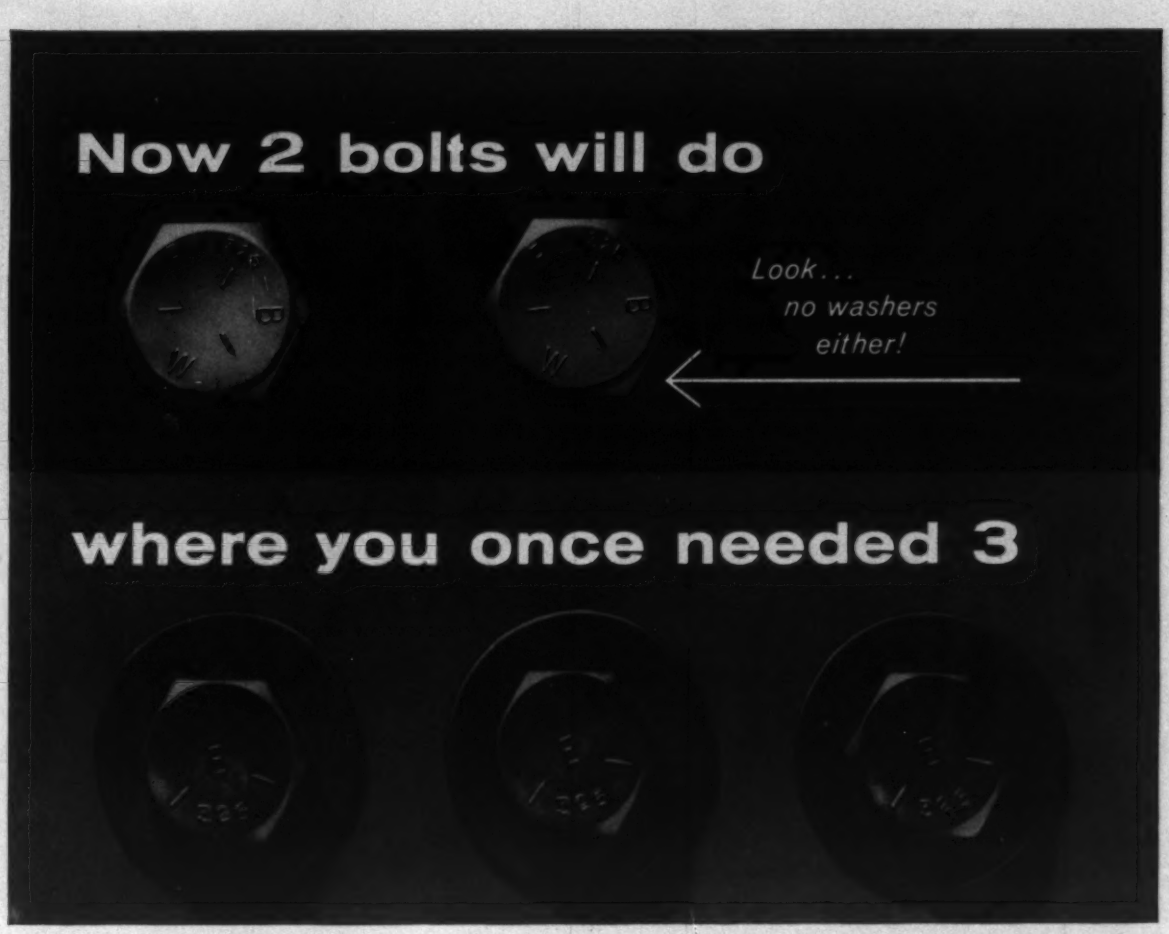
Mr. Schulz played a leading role in designing features of the proposed California State Water Plan, including Oroville Dam, key unit of the plan's Feather River Project, and an aqueduct system into southern California from the north.

"The matter is now in the hands of the voters, and there is little more I can do to help them reach a decision," he says. "The opportunity I am accepting now is such that I cannot afford to decline."

He will become vice president in charge of a new San Francisco office of Leeds, Hill & Jewett, Inc., a Los Angeles consulting firm.

A 49-year-old CE graduate from the University of California at Berkeley, Mr. Schulz began his career with the state in 1930 as a division of highways engineer. He moved to the division of water resources in 1938.

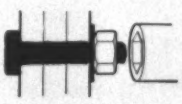
His present position, which he will leave on Nov. 15, came to him with the establishment of the department of water resources in 1956.



...when you connect bearing joints with new design RB&W High Strength Bolts

Majority of structural steel joints are bearing-type joints. This is precisely the type that can now be connected *faster, at less cost,* and *with full design strength* by taking advantage of the new large head RB&W High Strength Bolts.

Their shorter thread length assures that the shear plane of the joint will not pass through a threaded section (see sketch). Full shear strength of the bolt is now realized. Two bolts can do the work of three regular bolts . . . or replace three rivets.



In addition, the new larger head enables bolt to be torqued up to full recommended tension without any crushing of the bearing surface. Use one washer only—under the bolt head or nut, whichever is rotated during the wrenching.

This exciting new fastening improvement has been thoroughly tested under the auspices of the Research Council on Riveted and Bolted Structural Joints and is now approved by both the Council and the AISC.

As a leader in pressing for this now recognized improvement, RB&W is producing a full range of bolt sizes, all conforming to ASTM A 325 specification, all with *certified* quality. Start immediately to profit from the engineering, shop fabrication and field erection advantages afforded by RB&W High Strength Bolts. Send for details.

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Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland; Milwaukee; New Orleans; Denver; Fargo.

LARGEST INDEPENDENT PRODUCER OF HIGH STRENGTH BOLTS FOR CONSTRUCTION

BRONX APPROACH TO THROGS NECK BRIDGE

Weather resistance of basic lead boosts protection of steel

M50® basic lead silico chromate pigment makes this long-lasting protection possible.

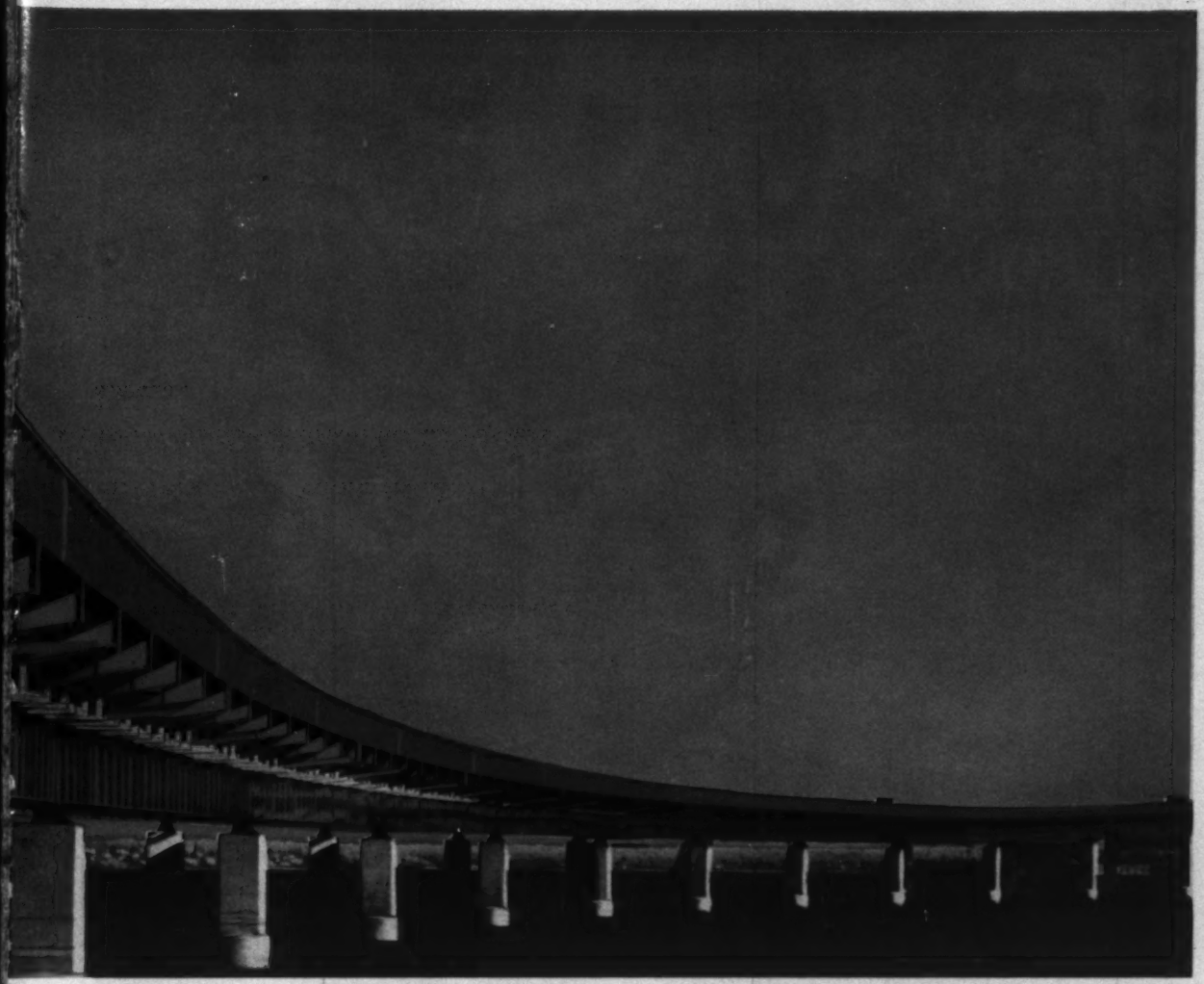
12,955 tons of steel are going into the Bronx approach to Throgs Neck Bridge . . . now being constructed for New York's Triborough Bridge and Tunnel Authority.

To prevent construction delays, steel was stock-piled at both shop and job well in advance. For this reason, and because of the erection schedule, it was anticipated that some of the steel would be exposed to weather for a year or more before final painting.

Full protection against rust during this long period might have been obtained by requiring repriming of the steel in the field. But it was easier, surer and less costly to specify, instead, a shop primer which contains basic lead silico chromate pigment.

Unlike any other rust inhibitor, basic lead silico chromate pigment combines corrosion inhibition of a high order with enduring resistance to weather.

The pigment contributes both properties to paint made with it. In exposure tests at National Lead Companies Test Station at Sayville, L. I., *M50* alkyd primers



More than a year of weathering in the field and during construction had to be anticipated before the *M50* maroon intermediate coat could be applied. Despite long exposure an *M50* shop primer does not chalk or leach away. With both the primer and the intermediate coat containing the active rust inhibitor pigment, basic lead silico chromate, this steel will be defended *in depth* against corrosion. Both coats will continue to provide full anti-corrosive action for years to come.

silico chromate shop primer during long exposure

3 mils thick have endured ten years of weathering with no finish coats to protect them.

In similar tests, finish coats were applied in a wide variety of colors on bare steel. These coats have given primer-type protection against rust formation.

So, for the first time, in addition to the primer all following coats of the paint system can contain an active rust inhibitor to provide "Defense-in-Depth" against corrosion.

For information...

For details about these modern anti-corrosion paints and paint systems formulated with *M50* basic lead silico chromate pigment, contact your regular paint suppliers.

M50® an **oncor**® *Pigment... A Development of* **National Lead Company**

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NEWPORT NEWS

MEN METHODS & MACHINES

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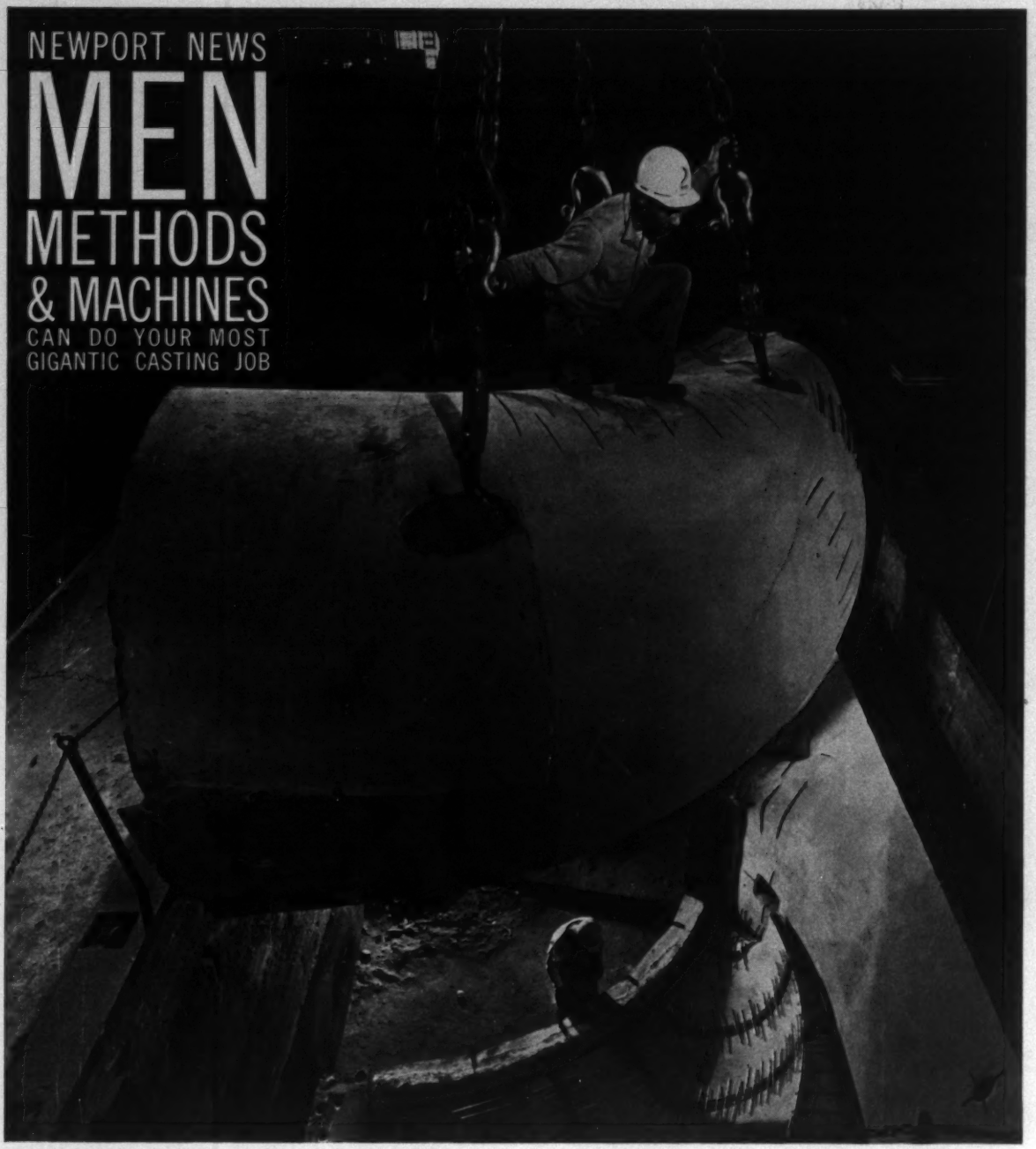

Mold for a section of a turbine stay ring for the Hartwell Power Plant. It is the largest one-piece Y-casting ever produced by Newport News.

It takes all three—men, methods and machines to tackle a job as big as this one! Newport News has completed many of them including six hydraulic turbines for the Niagara Project, four for the Hartwell Power Plant, and many others.

Newport News not only cast this giant unit but also milled it—and built the boring mill that did the work! No challenge is too great.

The secret of its leadership in the fabrication of heavy equipment is its staff of highly trained engineers and technicians, thousands of skilled workmen and 225 acre plant capable of turning out such projects as hydraulic turbines and valves, vacuum or pressure vessels for the petrochemical industry, bridge caissons, wind tunnels, and pulp and paper equipment.

Consult Newport News for preliminary recommendations at no obligation.

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Hull Picked for President By Professional Engineers

Noah E. Hull has been elected president of the National Society of Professional Engineers. He is vice president and general manager of the Hughes Gun Co., and assistant to the vice president, manufacturing, Hughes Tool Co., both of Houston, Tex.

Mr. Hull has previously served NSPE as a director and as National Society vice president for the Southwestern Region. A native of Houston, he has long been active in the San Jacinto chapter of the Texas Society of Professional Engineers, and is a former chairman (1955-58) of the Professional Engineers Conference Board for Industry.

Since receiving his degree in civil engineering from Purdue University in 1917, Mr. Hull has held executive positions with General Motors Corp., Firth Carpet Co. and National Gypsum Co. He went with Hughes Tool Co. as manager of the plant engineering division in 1946.

Briefs . . .

Public Works

Lester Eisner, Jr., has been named Regional Administrator for Region I of the Housing & Home Finance Agency to succeed **Walter S. Fried,** who has resigned to accept appointment to the New York City Housing and Redevelopment Board. Mr. Eisner will head the New York HHFA office, which administers the urban renewal, community facilities and related housing activities of the Agency in the New England states and the State of New York.

Arch L. Field has been elected president of the Los Angeles Board of Public Works, replacing **Adm. Cushing Phillips,** who retired last month. Mr. Field's present position as vice president of the board will be filled by **F. L. Sebesta.**

William H. Singleton has been appointed chairman of the State Water Control Board of Virginia. He succeeds **E. Blackburn Moore,** who has held the job since the board's creation in 1946.

Jack Stenberg, project manager of the Yakima Indian irrigation project at Wapato, Wash., has been promoted to general engineer in the Portland area office of the Bureau of Indian Affairs.

Robert T. Chuck is the new acting manager and chief engineer of the Hawaii Water Authority, succeeding **Louis H. Herschler,** who has entered private engineering practice.

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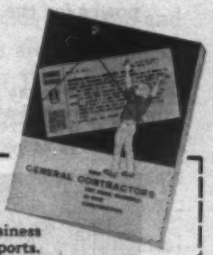

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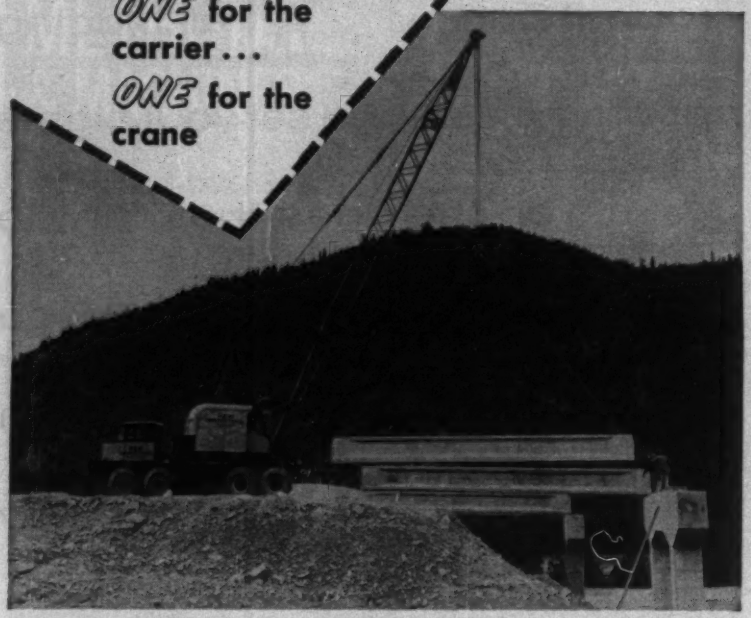
ONE for the carrier...
ONE for the crane



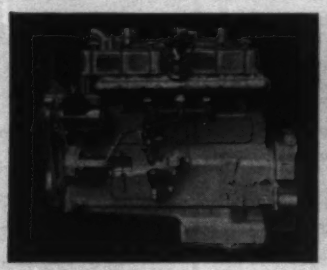
On new interstate highway near Tarkio, Montana—Pew Construction Co., contractors, of Missoula, Montana, are building overpasses for the Montana Highway Department, using an MC-530W Lorain truck-crane with two Waukesha Engines.

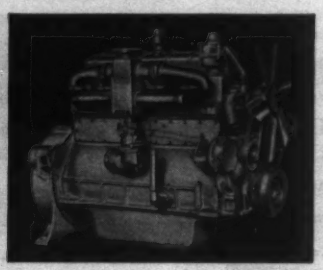
Setting prestressed concrete beams—40 to 45 ft. long, weighing 10½ to 12½ tons each — constructing highway-over-highway overpasses! And, lifting these beams on a radius of 32 ft., with a 65 ft. beam, the Lorain truck-crane did the job handily. Its crane engine, a Waukesha gasoline 135-GZB, has the sheer lifting power, and the quickly responsive, smooth power for maneuvering, with reserve power when needed. The carrier engine, a Waukesha gasoline 145-GKB, "has lots of power for the road" says the crane operator.

Send for Engine Bulletins.

Powering the Carrier—145-GKB Waukesha Gasoline, 5¼-in bore x 6-in. stroke, 779 cu. in. displacement. Max. hp 240 @ 2400 rpm.

Powering Crane (boom) 135-GZB Waukesha Gasoline, 4⅜-in. bore x 5-in. stroke, 451 cu. in. displacement. Max. hp 153 @ 2800 rpm.





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. . . Men and Jobs

Maj. Gen. Thomas A. Lane has been sworn in as president of the Mississippi River Commission. From his headquarters at Vicksburg, Miss., he will serve concurrently as Division Engineer of the Lower Mississippi Valley Division. He succeeds **Maj. Gen. W. A. Carter,** who becomes Governor of the Panama Canal Zone. Gen. Lane's last position was Commanding General, Fort Leonard Wood.

Maj. Gen. Gerald E. Galloway will move into the Honolulu headquarters of the Pacific Ocean Division to succeed **Brig. Gen. Ellsworth I. Davis** as Division Engineer. Gen. Davis has been named engineer for Europe. General Galloway's last assignment was Commanding General of the Army Engineering Center, Fort Belvoir, Va.

Col. Robert S. Palmer, new assistant division engineer, Corps of Engineers, Omaha, will assist **Maj. Gen. Keith R. Barney,** Division Engineer, in handling the Corps' missile-base construction program in the Missouri River Division.

Col. E. B. Downing will be the new deputy division engineer of the Lower Mississippi Valley at Vicksburg. He will also be secretary of the Mississippi River Commission.

New district engineers for the Corps of Engineers are:

Col. R. Paul West, Fort Worth District; **Col. Andrew P. Rollins,** Kansas City District; **Col. Joseph G. Kimble,** Albuquerque District and **Col. Alfred J. D'Arezzo,** St. Louis District.

Col. Harold C. Brown, Galveston District; **Col. Christian Hanburger,** Anchorage District and **Maj. Alfred H. Victor, Jr.** in the new Southeastern Alaska office at Juneau.

The United States Coast Guard has appointed **Capt. Hugh D. Wear** as chief of the engineering division of the Fifth District at Norfolk.

In the Bureau of Reclamation, **Robert A. Harris** has been named regional engineer at Boise, Idaho.

C. L. Wilbar, Jr., state Sanitary Water Board Chairman for Pennsylvania, has been elected vice-chairman of the Ohio River Valley Water Sanitation Commission to succeed **Ross H. Walker.**

Patricia L. Fuehrer is the Pennsylvania Health Department's new assistant regional engineer at Pittsburgh.

Otis Wright, veteran State Highway Department employee, has been named Nevada's Highway Engineer to replace **Edward L. Pine,** who has resigned.

David K. Whiteford, planning engineer for the Delaware State Highway Department, has resigned to become director of the joint federal-state-county survey in the Pittsburgh area to determine traffic needs until 1980.

Quaker Thermoid

"COLEDGE" BELTING REDUCES EDGE WEAR, ADDS MILES OF USE!

Improper training can ruin a conveyor belt faster than any other abuse. Riding up and rubbing against a frame member soon wears away the stiff edge of conventional belting and exposes the carcass plys to moisture, mildew, dirt and eventual ply separation. "Coledge" belt construction was developed by Thermoid Division—to overcome this weakness and extend belt life.

"Coledge" construction puts plenty of extra rubber on the edges where it counts most . . . the plys are stepped back to make a more flexible edge that rides with the punches when misalignment occurs. This "Coledge" construction can put many extra miles on your system, especially in coal fields and sand and gravel pits where most belt failures are the result of excessive edge wear. Exclusive with Thermoid Division, "Coledge" construction is available in any standard type belt your application may require.

So, if you have an edge-wear problem with conveyor belts, specify "Coledge" construction. See your Thermoid Division industrial distributor for technical data or assistance, or write *Thermoid Division, H. K. Porter Company, Inc., 200 Whitehead Road, Trenton 6, New Jersey.*

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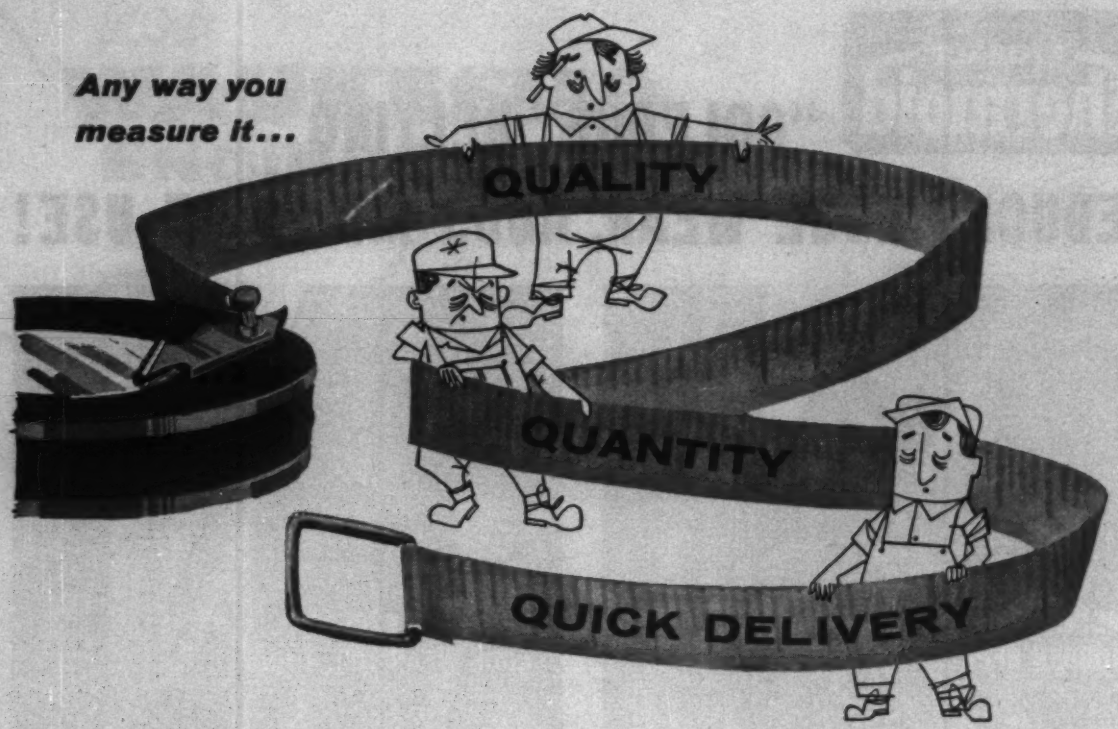

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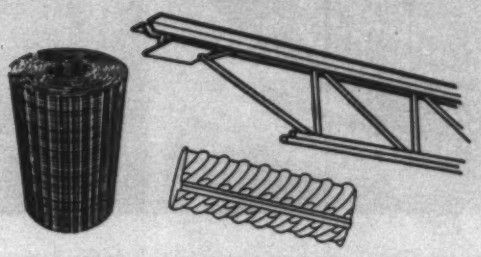

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Books

Bridge Design Guide

MANUAL OF BRIDGE DESIGN PRACTICE—By Bridge Department, California Department of Highways, 638 pages. Documents Section, Printing Division, State of California, N. 7th St. and Richards Blvd., Sacrament 14, Calif. $12.50. ($13 in California, $13.50 outside U.S.).

This is a reference work on bridge design that will be useful to novices and experienced engineers. It was developed originally for an in-service training program in 1952 and has been in use ever since, with occasional revisions. Because of numerous requests for copies, the California Bridge Department decided to make it available to others.

One of the most valuable sections of the book is the one dealing with bridge economy. It contains charts and other data to aid in the selection of the most economical type of framing from among 12 of the most common types in use. Charts give quantities and unit prices of materials, costs per square foot and the California bridge construction cost index. Also, California's cost experience is pictured in charts showing contract prices and high and low bids. The value of these data is somewhat impaired because the termination data is mid-1952. However, the principles of applying them are sound.

In the rest of the book, moment distribution is reviewed, bridge loadings are discussed, theory of prestressed concrete is explained and various types of bridges analyzed.

Basics of Prestressing

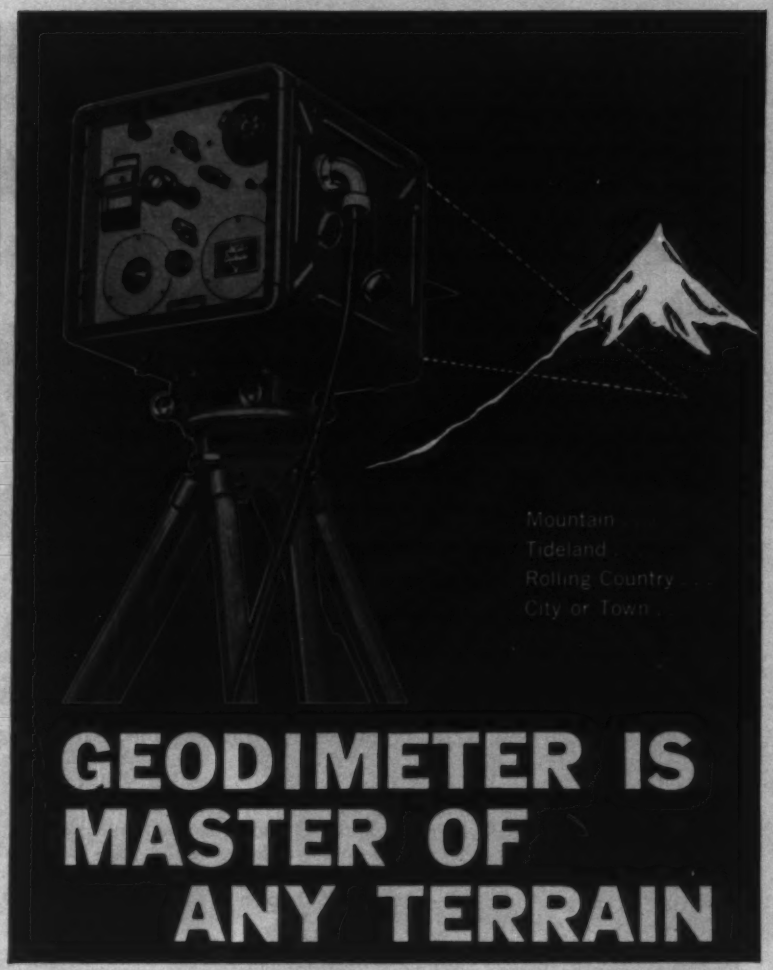
PRACTICAL PRESTRESSED CONCRETE—By H. Kent Preston. 340 pages. McGraw-Hill Book Co., New York, Toronto, London. $11.50.

Both experienced engineers and those seeking to learn about prestressed concrete from the start will find this book worth studying. The author is one of the pioneers of prestressed concrete in the U.S. and treats the subject from the practical viewpoint, as stated in the title of the book.

The book explains the basic principles of prestressed concrete clearly and simply. It discusses design procedures for simple and continuous beams, working out examples to demonstrate the methods. And it covers construction methods and equipment.

Applications illustrated include bridges and buildings. One chapter covers prestressed piles. There also is a chapter on specifications.

(*Books continued p. 90*)



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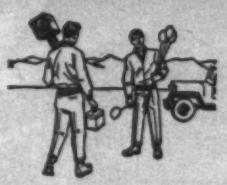

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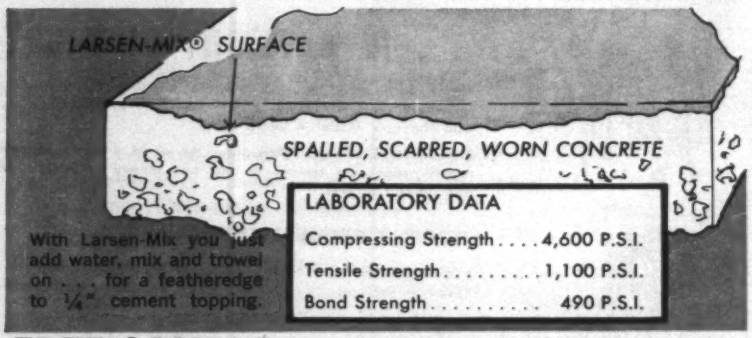
4. To use as a bonding mortar for pre-cast concrete objects, including slate, marble etc.

You'll find Larsen-Mix foolproof in terms of application. For economy, coarse sand may be added to fill deep cracks and pitted concrete. Anti-slip surfaces may be obtained by adding abrasive grains. Color may be added to traffic markings. Larsen-Mix is non-fuming, contains no volatile organic solvents. It is another fine product of Larsen Products Corporation, Bethesda 14, Maryland.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. . . Books

HYDRO-ELECTRIC PROGRESS IN CANADA, 1959—Bulletin No. 2700 reviews current water-power development throughout Canada and other construction pertaining to electric power supply and distribution. Director, Water Resources Branch, Department of Northern Affairs and National Resources, Ottawa, Canada. Free.

SOIL MECHANICS AND EARTH STRUCTURES—Provides information to help get basic data on the structural properties of underlying soils. Bureau of Yards and Docks, U. S. Navy. 146 pages. Order PB 151613 from OTS, U. S. Department of Commerce, Washington 25, D. C. $2.75.

STUDY OF DEEP SOIL STABILIZATION BY VERTICAL SAND DRAINS—Study develops factual correlations between actual and predicted performance of sand drains under the loads of fill placed on unstable foundation soils. Moran, Proctor, Mueser & Rutledge for Bureau of Yards and Docks, U. S. Navy. 468 pages. Order PB 151692 from OTS, U. S. Department of Commerce, Washington 25, D. C. $6.

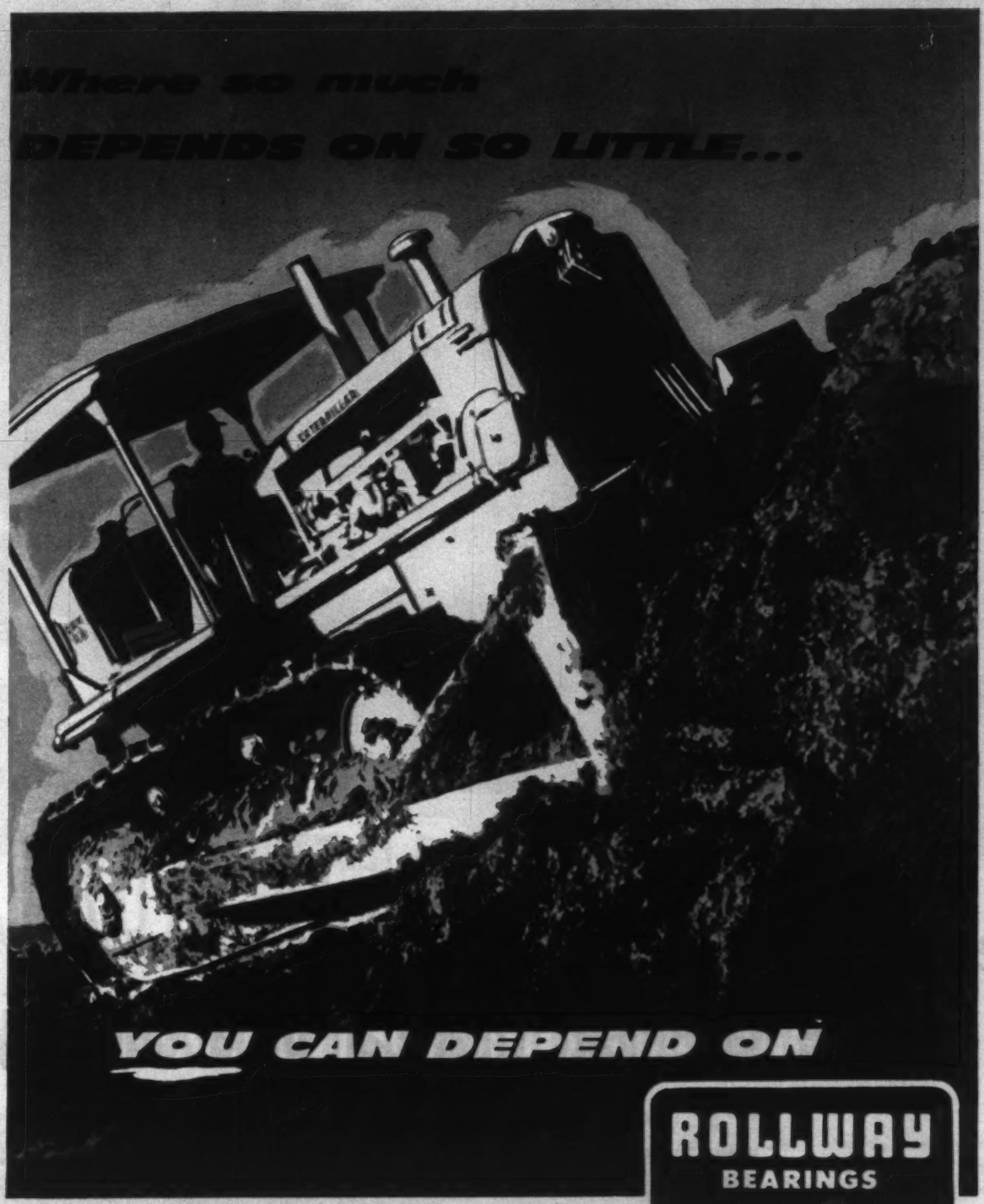
ON THE APPLICATION OF PLASTIC DESIGN—This 65-page report by Lynn S. Beedle reviews the development of plastic theory in structural steel design, the extent of its adoption in building codes of nations throughout the world, and its present and probable future uses. The report is well illustrated with charts, graphs and photographs. An appended bibliography lists many significant books, papers and articles on the subject. Fritz Engineering Laboratory, Department of Civil Engineering, Lehigh University, Bethlehem, Pa.

REPORT OF THE ILLINOIS STATE WATER SURVEY—Circular 79, by W. C. Walton, R. T. Sasman and R. R. Russell. Illinois State Water Survey, Department of Registration and Education, Box 232, Urbana, Ill. Reports on dangers of overpumping of ground water in the Chicago area. Free.

FEDERAL PROGRAMS FOR COLLECTION OF DATA ON WATER USE—By Inter-Agency Committee on Water Resources, compiled by U. S. Department of Health, Education, and Welfare, Public Health Service. 43 pages. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Fourteen Federal agencies are collecting data on the uses of water. Booklet lists their programs according to the category of water use, scope of data-collection programs, availability of data and miscellaneous details. 35 cents.

ENR Index Is Ready

ENR's index of Editorial Content for January through June is now being sent to those on our index mailing list. The index is free. Copies of the '58 and '59 indexes also are available. To put your name on the mailing list, write: Indexing Department, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.



The rugged Caterpillar crawler Tractor above is depended upon throughout the world to keep the big jobs moving. A single bearing failure can cause costly delays, perhaps endanger job completion in contract time. That's why Caterpillar and other well-known makers depend on Rollway bearings in vital spots! Rollway Bearing Company, Inc., Syracuse, N. Y., manufacturers of a complete line of radial and thrust cylindrical roller bearings. Write for a complete product line catalog.

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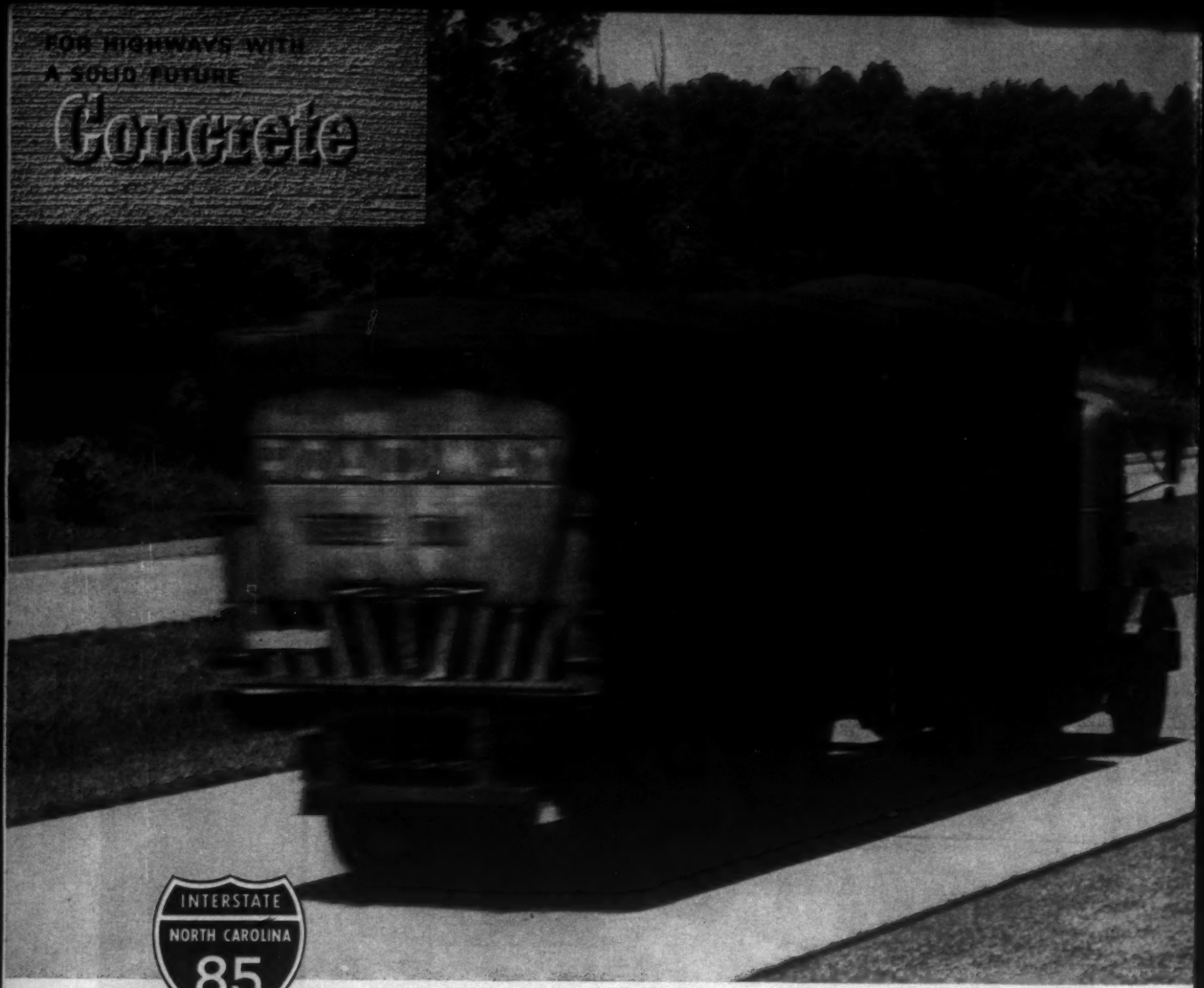


They've engineered Interstate 85 to last 50 years and more!

is the one pavement that can be accurately

Research year after year has given engineers comprehensive data on the behavior of concrete roadway slabs as well as the supporting subgrade. Mobile units such as shown at right can be set up to measure pavement deflections to an accuracy of one-half thousandth of an inch.

CONCRETE

designed to fit future traffic loads!

Interstate System highways like North Carolina's route 85 pictured here owe much of their extra-long life expectancy to concrete's dependable load-bearing strength—computed mathematically.

The strength of concrete pavement is in the concrete itself—not in built-up, graded, layer construction. Compressive and flexural strengths can be measured exactly—right down to the last psi. So designs are based on *facts*—not intuition!

And because concrete acts as a beam, even one extra inch of thickness adds as much as 25% to wheel load capacity. This same structural quality makes it possible to analyze stresses for *all* loads the pavement will carry. The designer then makes the pavement thick enough for unlimited operation of the more frequent loads as well as the expected heavier loads.

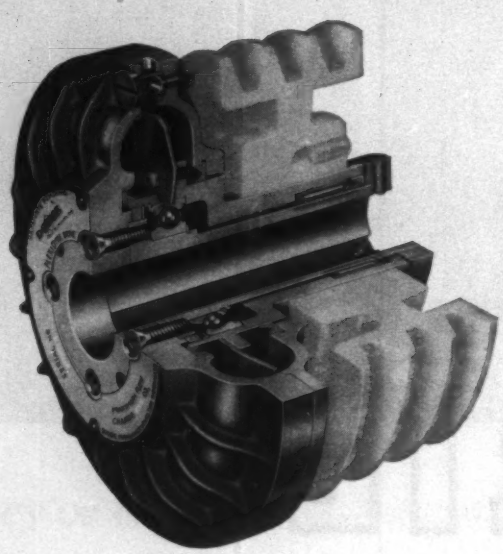
That's where real economy comes through—only concrete lets engineers design highways to last 50 years and more, with upkeep costs as much as 60% lower than for asphalt. Yet concrete's first cost is moderate. There is no need to overbuild. The accuracy of today's concrete design methods provides minimum-thickness pavements for the heaviest expected traffic.

Look for concrete on many more miles of the new Interstate System and other heavy-duty highways.

PORTLAND CEMENT ASSOCIATION *A national organization to improve and extend the uses of concrete*

WHAT'S YOUR PROBLEM?...

- ☑ Overheated motors?
- ☑ Excessive belt maintenance?
- ☑ Breakage of materials being processed —like thread, wire, paper?
- ☑ Expense of oversize or high torque motors?
- ☑ High demand rate?
- ☑ Expense of reduced voltage starters?
- ☑ Clutch trouble?
- ☑ Breakage of transmission parts due to instantaneous shock loads?
- ☑ Damage and recurring down-time from overloads?



FLEXIDYNE

THE DRY FLUID DRIVE

It is no longer necessary to accept the destructiveness—the costliness—of conventional starting in the mechanical transmission of power. Flexidyne changes that!

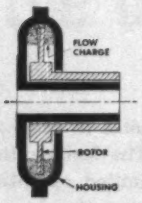
Flexidyne is the new way to start loads *smoothly*—to protect against shock and overload—to save power—all *without any sacrifice of efficiency at full load!*

This revolutionary development is ushering in "the day of the soft start"—which can mean thousands of dollars to you in equipment savings and in better, more economical operation.

Flexidyne is available, off the shelf, in Drives and Couplings. Capacities range from fractional to 1,000 hp. Ask your local Dodge Distributor or write us for technical bulletin.

DODGE MANUFACTURING CORPORATION, 6900 Union St., Mishawaka, Ind.

HOW FLEXIDYNE WORKS



The "dry fluid" in Flexidyne is tiny heat-treated steel shot. A measured amount, called the "flow charge," is contained in the housing, which is keyed to the motor shaft. Inside the housing is a rotor, free to revolve relative to the housing, but connected to the load.

When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, packing it between the housing and the rotor, which transmits power to the load. Initial slippage is momentary. Housing and rotor become locked together and achieve full load speed without slip and at 100% efficiency.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

DODGE

of Mishawaka, Ind.

Wall and spillway concrete take 21% of . . .

Massachusetts Dam Contract

Concrete for walls and spillway, 9,500 cu yd at $25 per yd, is the largest item (21%) in this $1,124,422 contract for construction of the 3.6-billion-gal Westville Dam, a flood control project on the Quinebaug River, Mass.

The Corps of Engineers, Providence, R. I., awarded the contract to Gil Wyner Co., Inc., Malden, Mass., on a low bid 10% over the engineer's estimate.

The rolled earthfill dam, with rock slope protection, will be 560 ft long and 78 ft high above stream bed. Width at the top will be 25 ft, for a paved walk. Concrete spillway length is 20 ft, height of spillway, 66 ft above stream bed.

Work includes excavation, fill, rock slope protection, concrete walls, spillway, control house and intake, gates and accessories, electrical work, utility buildings, diesel generator, surfacing, mobilization and demobilization for foundation drilling and grouting, topsoiling and seeding, and other related work.

Prevailing wages include: carpenter, $3.20; crane & power shovel operator, $3.90; tractor operator, $3.525; concrete finisher, $3.80; common laborer, $2.55.

The bidding included:

1C	Gil Wyner Co., Inc., Malden, Mass. $1,124,422
2	John Capobianco, Boston 1,153,985
13	Peter W. Kero, Inc., Carlstadt, N. J. 1,636,563
EE	Corps of Engineers, Providence, R. I. 1,019,126

Bids: 3-15-60 Items	Unit	Quantity	Unit Prices 1C	2
Site preparation	ls	job	$15,000	$50,000
Reservoir clearing	ls	job	5,000	5,000
River control & diversion	ls	job	14,500	10,000
Excavation, uncl, general,				
1st 89,000 cy	cy	89,000	0.65	0.45
over 89,000 cy,	cy	22,000	0.65	0.35
borrow area B,				
1st 35,000 cy	cy	35,000	0.45	0.45
over 35,000 cy	cy	15,000	0.40	0.35
borrow area C	cy	75,000	0.45	0.45
borrow area E,				
1st 33,000 cy	cy	33,000	0.45	0.45
over 33,000 cy	cy	15,000	0.45	0.35
rock, 1st 42,000 cy	cy	42,000	2.60	3.00
over 42,000 cy	cy	11,000	2.60	2.90
Clean up for inspection	sy	330	7.00	5.00
Line drilling	sf	7,300	1.80	2.00
Safety mesh	sy	980	1.50	2.00
Rock bolting	ea	200	16.00	16.00
Mortar for foundation prep.	cf	100	8.00	5.00
Random fill, 1st 57,000 cy	cy	57,000	0.24	0.25
over 57,000 cy	cy	14,000	0.24	0.25
Fill, pervious	cy	25,000	0.27	0.25
impervious	cy	64,000	0.39	0.25
Backfill, pervious	cy	20	14.00	5.00
impervious	cy	550	6.00	2.00
Embankmt rolling, added	hr	200	16.00	20.00
Fill, impervious stripping	cy	7,500	0.25	0.25
Road fill	cy	6,800	0.35	0.25
gravel	cy	3,700	0.75	0.55
Crushed stone	cy	200	5.00	6.00
Gravel bedding	cy	16,500	3.00	0.65
Rock fill dam,				
1st 36,000 cy	cy	36,000	0.00	1.25
over 36,000 cy	cy	8,500	0.00	1.00
Rock slope protection	cy	19,800	1.50	1.75
Conc, wall & spillway	cy	9,500	25.00	30.00
control house, above elevation 580	cy	730	40.00	40.00
intake	cy	230	50.00	50.00
misc	cy	45	68.00	70.00
Cement	bbl	15,800	4.80	5.00
Steel reinforcement	lb	144,000	0.16	0.15
Anchor bars, type A	ea	41	44.00	25.00
type B	ea	53	58.00	25.00
Fndn drilling & grouting, mobil & demobil for	ls	job	2,500	1,500
drill grout holes	lf	2,800	7.75	5.00
drain holes	lf	140	16.50	10.00
exploratory holes	lf	200	16.50	10.00
grout, portland cement	cf	2,000	2.65	1.50
mineral filler	cf	100	3.50	1.50
sand	cf	300	0.60	1.50
placing	cf	2,400	6.20	5.00
conn to grt holes	ea	250	10.00	10.00
Copper waterstops	lb	940	2.00	2.00
Control house, misc	ls	job	8,300	5,500
Gates & accessories	ls	job	39,000	45,000
Air vent & accessories	ls	job	10,700	6,500
Diesel-elec generator set	ls	job	12,000	8,000
Monorail hoist	ls	job	1,200	1,500
Gallery ventilation system	ls	job	2,600	2,500
Misc metals	lb	14,000	0.75	0.60
Aluminum	lb	900	2.00	2.50
Elec light & power	ls	job	18,000	15,000
Tile gages	ls	job	1,000	900.00
Precast concrete curbing	lf	290	2.60	5.00
Highway guard rail	lf	2,130	2.00	2.50
posts	ea	20	9.50	10.00
Chain link fence	lf	450	2.75	2.00
Utility building	ls	job	29,000	36,000
Flag pole & base	ls	job	1,100	900.00
Log boom	ls	job	3,500	2,500
RC culvert, 15"	lf	35	8.00	5.00
18"	lf	110	9.00	6.00
Bit conc road surfacing	sy	5,000	1.25	1.25
Topsoil, class AA	cy	175	2.50	4.00
class B	cy	1,700	1.25	2.00
Seeding, class A	ac	0.2	2,000	2,000
cl B on cl B topsoil	ac	2.0	900.00	1,500
on cl C seedbed	ac	18.0	900.00	500.00

Commence: 4-12-60. Completion schedule: 22 months.

North Dakota Highway Prices—1959

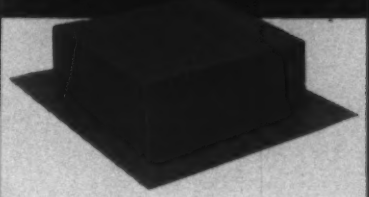
Selected Items	Unit	Unit Bid Prices
Water for compaction	Mgal	$1.94
Excavation, roadway class A	cy	0.20
Subgrade preparation, type C1	sy	0.04
Riprap, loose rock	cy	1.83
Underdrain, 6"	lf	1.86
Right of way markers	ea	8.29
Excavation, structural, class 3	cy	9.44
Pavements, conc air entr, 10"	sy	2.68
Port cmt, air entr	bbl	5.82
Conc, struct, cl A, 1½"	cy	59.16
Steel, reinforcing	lb	0.14
structural	lb	0.18
Timber piling, untreated	lf	2.38
treated	lf	2.71
Piling, steel encased	lf	5.76
RCP, 18"	lf	4.14
24"	lf	6.81
30"	lf	9.01
36"	lf	13.10
48"	lf	19.40
60"	lf	28.35
extra strength	lf	31.67
flared end, 24"	ea	51.47
St sec conc cattle pass int sec	lf	29.82
CMP, 18"	lf	3.93
24"	lf	6.44
Comb conc curb & gutter	lf	2.55
Guard rail, 4 cable	lf	4.94
Top soil for seeding	cy	0.20
Sodding	sy	0.52
Wire fence, wood posts	lf	0.20
Pit run gravel	t	1.20
Asph, emuls, bit tr base	gal	0.15
gravel for	t	1.14
Gravel surface, class 9	t	0.92
Comb aggr for AC base, cl 21	t	3.16
Bit, pene prime & tack	gal	0.15
Wear course, comb aggr, cl 20	t	3.48
asph conc mix	gal	0.14
Cover aggr, cl 23, for seal	t	4.95
Bitumen for seal	gal	0.17

JAY-PANS

America's Finest Forming Medium for

CONCRETE CONSTRUCTION

Saves money! Saves labor! Saves time!



ECONOMICAL! Although priced competitively with conventional forms, Jay-Pans give you more for your money! Always new . . . custom built . . . they eliminate drippage, and the vertical sides mean good savings in concrete, as well as a nice, smooth appearance.

LABOR-SAVING! Jay-Pans are tailored for any job, and when cutting is necessary, all that is required is a saw or pocket-knife. Sand is never placed under a Jay-Pan pour, and jobs stay on schedule because there are always enough Jay-Pans on the job site. Lightweight, easy to use, Jay-Pans end chipped floors, save both time and men!

WEATHER-RESISTANT! These are not regular "paper"-pans. Jay-Pans are made of "freezurboard"—a patented, heavy-duty asphalt-impregnated material similar to asphalt roofing, which is saturated with asphalt. Millions of square feet of federal government, state, and private projects have proved the reliability of Jay-Pans under all weather conditions.

ALL SIZES! Tapered, adjustable, long span, waffle, or cored slab, Jay-Pans give a clean job . . . come in all standard sizes as well as practically any other size you need to fit your most economical module.

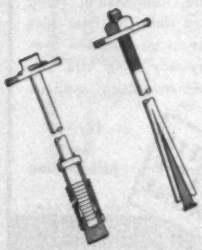
For Full Free Information

WRITE WIRE PHONE

LAWRENCE PAPER COMPANY

Construction Products Division

VIking 3-8111 Lawrence, Kansas



Bethlehem rock bolts minimize the danger of rock slides by locking together stratified rock slabs. They are also widely used in railroad and mine tunnels where they reduce the danger of roof falls.

STEEL ROCK BOLTS . . . MADE IN TWO TYPES

Bethlehem makes a 1-in. diameter wedge-type slotted bolt; we also supply a headed bolt, which comes in $\frac{5}{8}$-in. and $\frac{3}{4}$-in. diameters. Both rock bolts perform the same function.

The wedge-type slotted bolts are driven with percussion tools, wedge-first, into pre-drilled holes. The wedge spreads the slotted end to provide firm anchorage. Plate washers, 6-in. square, are used for additional support.

The headed rock bolt is used with an expansion shell. When the bolt is tightened, the leaves of the shell expand, locking the bolt tightly in the hole.

Solve the rock-fall troubles along your right-of-way with Bethlehem rock bolts. For full details contact your nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Materials Prices

Monthly Market Quotations by ENR Field Reporters

LUMBER, TIMBER, PLYWOOD PER M FT.B.M., CARLOAD LOTS F.O.B.

SOUTHERN PINE AND DOUGLAS FIR

All Southern Pine is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)
All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rs4s	6x12 Rs4s	12x12 Rs4s	LONG LEAF Y. P. Merchantable grade up to 20 ft. 2x12 Rs4s	12x12 Rs4s	FIR PLYWOOD ⅜" Interior plyscored, C-D gr.	¾" Plyform grade*
Atlanta	$ 90.00	$ 90.00	$ 92.00	$ 90.00	$ 90.00	$ 95.00	$125.00	.....	.....	$135.00	$155.00	$125.00	$270.00
Baltimore	96.00	96.00	102.50	100.00	108.00	108.00	125.00	.....	.....	175.00	190.00	175.00	275.00
	118.00g	*122.00g*	*125.00g*	*126.00g*	*126.00g*	*126.00g*	*150.00g*	*$180.00*	*$170.00*				
Birmingham	85.00	87.00	84.00	88.00	91.00	97.00	116.00	.....	.....	120.00	173.00	120.30	204.80
	80.00	*80.00*	*83.00*	*81.00*	*81.00*	*98.00*	*88.00*	*88.00*	*88.00*	.....	.....		
Boston	102.00f	102.00f	102.00f	102.00	102.00f	120.00a	.....	.....	.....	.....	.....	155.00c	285.00c
	106.00	*106.00*	*118.00*	*118.00*	*118.00*	*124.00*	*150.00*	*154.00*	*170.00*				
Chicago	116.00	119.00	113.00	127.00	135.00	136.00	121.00	.....	.....	159.00	159.00	140.00	228.00
	122.00	*122.00*	*135.00*	*138.00*	*138.00*	*154.00*	*148.00*	*148.00*	*148.00*				
Cincinnati	102.50	103.75	98.50	98.00	104.75	112.75	121.00	.....	.....	138.00	125.00	92.00f	170.00f
	105.50	*109.00*	*109.00*	*109.75*	*111.50*	*116.50*	*148.50*	*148.50*	*148.50*	.....	.....		
Cleveland	98.00	100.00	100.00	98.00	102.00	108.00	.....	.....	.....	.....	.....	118.00a	198.00
	.....	.....	*115.00*	*110.00*	*118.00*	*116.00*	*140.00*	*140.00*	*140.00*	.....	.....		
Dallas	95.00k	99.00k	103.00k	103.00k	103.00k	108.00k	135.00	.....	.....	138.00	180.00	112.50ac	200.00ac
Denver	*Not in stock*		*119.00*	*119.00*	*119.00*	*121.00*	*177.00*	*197.00*	*197.00*	.....	.....	146.50	252.00
Detroit	140.00	142.50	142.00	138.00	145.50	145.00	.....	.....	.....	153.50	.....	150.00ge	225.00ge
	138.85	*138.85*	*145.85*	*141.50*	*150.00*	*155.50*	*194.00*	*211.00*	*211.00*	.....	.....		
Kansas City	120.00	120.00	125.00	125.00	128.00	130.00	.....	.....	.....	.....	.....	135.00	215.00
	180.00	*180.00*	*185.00*	*185.00*	*198.00*	*182.00*	*168.00*	*225.00*	*225.00*	.....	.....		
Los Angeles	*98.00*	*98.00*	*98.00*	*98.00*	*98.00*	*98.00*	*134.00*	*145.00*	*145.00*	.....	.....	120.00	210.00
Minneapolis	*145.00*	*145.00*	*145.00*	*145.00*	*145.00*	*145.00*	*186.00*	*186.00*	*186.00*	.....	.....	195.00	305.00
Montreal	84.00a	90.00a	84.00a	84.00a	99.00a	125.00a	.....	.....	.....	120.00	120.00	119.25	225.95
	160.00	*160.00*	*160.00*	*160.00*	*160.00*	*160.00*	*170.00*	*170.00*	*170.00*				
New Orleans	89.00	89.00	91.00	95.00	95.00	98.00	128.00	.....	.....	182.00	185.00	117.19	200.71
	103.50	*103.50*	*103.50*	*105.50*	*106.50*	*106.00*	*122.00*	*115.50*	*115.50*	.....	.....		
New York	115.00	118.00	120.00	127.00	127.00	129.00	250.00	.....	.....	250.00z	250.00z	116.70z	197.60z
	.....	.....	*120.00*	*122.00*	*122.00*	*125.00*	*169.00*	*174.00*	*174.00*	.....	.....		
Philadelphia	110.00	112.00	112.00	110.00	112.00	110.00	125.00	.....	.....	.....	.....	138.00h	230.00h
	.....	.....	*125.00*	*125.00*	*125.00*	*125.00*	*145.00*	*145.00*	.....	.....	.....		
Pittsburgh	135.00	135.00	135.00	135.00	140.00	140.00	165.00	.....	.....	145.00	165.00	225.00	295.00
	135.00	*115.00*	*145.00m*	*150.00*	*150.00*	*150.00*	*295.00*	*295.00*	*295.00*	.....	.....		
St. Louis	117.00	117.00	125.00d	125.00d	125.00e	124.00e	.....	.....	.....	.....	.....	162.30achj	244.00ach
	.....	.....	*134.00*	*134.00e*	*134.00e*	*134.00e*	*189.00e*	*189.00e*	*189.00*	.....	.....		
San Francisco	*79.00*	*79.00*	*86.00*	*86.00*	*86.00*	*86.00*	*97.00*	*120.00*	*125.00*	.....	.....	90.00h	160.00h
Seattle	*64.00*	*64.00*	*70.00*	*71.00*	*71.00*	*72.00*	*85.00*	*90.00*	*90.00*	.....	.....	105.00aeg	190.00aeg
Toronto	82.00a	86.00a	84.00a	81.00a	94.50	84.50a	98.00a	.....	.....	86.00a	.....	216.00	261.00
	89.00	*92.00*	*102.00*	*105.00*	*108.00*	*119.00*	*155.00*	*150.00*	*150.00*	.....	.....		

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL.

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Federal tax exempt, add 8% mun. & prov. tax. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *f Hemlock *g No. 1 common. *j 8 ft. lengths. *k No. 3 common. *l Add 2% sales tax. *n Less 2% disc. 10 days. *o Less 2% disc. 10th. *p Less 1% disc. 10 days. *q fir: $80.25 in truck lots, fob job or CL, f.o.b. city. *r For f.o.b. city price add $8 for pine, $32 for fir eff. 1/1/58. *s add trucklots. *t trucklots del. *u Retail LCL yard. *v Retail LCL, del. *w add 8% mun. & Prov. tax. *x add 4% sales tax. *z Hondouras Pine.

* PLYWOOD (Plyform, oiled and edge sealed): Douglas fir, 4' x 8' panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, interior, moisture resistant, ¼", $146.00; ¾", $188.00 Exterior, waterproof, ¼", $150.00; ¾", $170.00. *a Delivered. *c Truck lots. *d A-C exterior. *e LCL. *f less 1%, 5 days. *g less 2% for cash. *h less 2% disc, 10 days. *j add 2% sales tax.

GLASS, EXPLOSIVES, CHEMICALS, PILES, TIES

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 500 lb. lots
Atlanta	78%	80%d	$0.2595
Baltimore	74%d	74%d	.2795
Birmingham	82%f	82%f	.2595
Boston	73-10%p	73-10%p	.2795
Chicago	73%	73%	.2795
Cincinnati	74%	74%	.2595
Cleveland	74-3-10%	74-3-10%	.2595
Dallas	78%	78%	.2570
Denver	73.8%	73.8%	.2795
Detroit	73-10-10%	73-10-10%	.2795
Kansas City	76-10-10%	76-10-10%	.2795
Los Angeles	$12.88/17.32h	$10.45/14.13h	.2795
Minneapolis	71-10%	71-10%	.2795
Montreal	40-10-5%h	40-10-5%h	23.20h
New Orleans	76%g	76%g	.2795
New York	79%j	79%j	.5130g
Philadelphia	75%	80%	.2795
Pittsburgh	73%	73%	.2595
St. Louis	73-10-10%mo	73-10-10%mo	.2795
San Francisco	80%	73%	.2795
Seattle	$8.85/11.55hiq	$6.41/9.67hjp	.2795
Toronto	$8.40/9.57h	$5.90/8.70h	

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, sa, $42.75 for A quality, $37.50 for B quality; 14 x 26, ds, $60.00 for A quality, $52.75 for B quality. *b sales tax extra. *c 77% for single strength. *d From 6/15/52 list. *e 77% for double strength. *f Single strength; double strength, 83%. *g From 8/1/58 list. *h sa/ds, 40-in. *i 20 boxes min. *j CL quantity. *k eff. 12/58. *l eff. 10/15/58. *m less 2% disc, 10 days. *n less 1% disc, 10 days. *o add 2% sales tax. *p less 1% for cash. *q less 2% for cash

Explosives: Cartridges of 1¼" diameter or over, in standard lengths. *g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. *h F.o.b. Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60%, $24.30 in fiber cases: forcite 40%, $24.05; forcite 60%, $25.80.

40% Ammonia Gelatin price ranges in other than urban areas, per lb: (except Seismograph Grades)

	C/L 300,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0.2095	$0.2195	$0.2545	$0.2695
Group 2†	.2170	.2270	.2620	.2770

* All areas except those in Group 2 and N.J. cities of Bayone, Hoboken, Jersey City, No. Bergen, Union City and Weehawken † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucieand south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan, Robertson, Leon, Houston, Angelina, Nacoodoches, Shelby and south thereof.

PILES

Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid-South, over fifty feet, on freight from deep South.

Dimensions	Points	Length	By Rail Pine*§ R	Fir R
12" at butt	6-in.	30 to 39-ft.	$0.42a	....
12"—2-ft. from butt	6-in.	40 to 44-ft.	.91	....
12"—2-ft. from butt	6-in.	45 to 49-ft.	.97	....
13"—2-ft. from butt	6-in.	50 to 54-ft.	1.01	....
13"—2-ft. from butt	6-in.	55 to 59-ft.	1.07	....
14"—2-ft. from butt	6-in.	60 to 64-ft.	1.14	....
14"—2-ft. from butt	6-in.	65 to 69-ft.	1.21	....
14"—2-ft. from butt	6-in.	70 to 74-ft.	1.34	1.40
14"—2-ft. from butt	6-in.	75 to 79-ft.	1.41	1.40
14"—2-ft. from butt	5-in.	80 to 84-ft.	1.54	1.45
14"—2-ft. from butt	5-in.	85 to 89-ft.	1.67	1.54

* Pine piling over 90 feet available only in limited quantities. § ASTM Class B
* a, trucked in from N. J.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:

		8' x 8" x 8' Untr.	8' x 8" x 8' Tr.	7' x 8" x 8'6" Untr.	7' x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 3 $2.25	$3.33
	Grade 2	1.50	2.35	" 2 2.10	3.18
	Grade 1	1.15	2.00	" 1a 1.70	2.78
Chicago	Red Oak	2.95-3.00	4.00a-4.10	3.90	4.75-5.00
New York	Mixed Hardwood	3.45	5.10	4.30	6.50
	Mixed Oak	3.55	5.20	4.40	6.60
Philadelphia	Mixed Oak	3.70i	3.87	.....	4.37
St. Louis	Mixed Oak	2.65	3.75a	3.10h	4.20ah
San Francisco	Douglas Fir	2.02ef	3.30ef	2.37ef	3.60ae

Tr.—Treated; Untr.—Untreated. aCreosoted. c Empty cell. e Green f.o.b. cars. g 7 x 9 x 8'6" * Add 75¢/tie freight charge to Birmingham. *i 7" x 9" x 9½". *l Mixed Hardwood

CHEMICALS

Water, sewage treatment, road work, carlots, f.o.b. works

Chlorine cylinders, liquid, per lb. freight allowed, N.Y. State	$ .11
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, ton	32.00
Silicate of soda, 52 deg., in drums, per 100 lb.	2.65
Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
Sulphate of aluminum, commercial, in 100-lb. bags	2.05
Sulphate of copper in bags, 99% per 100 lb., reg., 25.2% copper content	13.00

See following ENR issues for OTHER PRICES:

- Wage Rates, Building Board, Lath, Insulation; Last, July 28; Next, Sep. 1.
- Cement Aggregate, Ready-Mixed Concrete, Asphalt; Last, Aug. 4; Next, Sep. 8.
- Iron & Steel Products, Pipe. Last, Aug. 11; Next, Sep. 15.
- Clay Products, Lime, Plaster, Paint, Roofing: Last, July 28; Next, Aug. 25.

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELIZABETH WERRA, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

▲ **Mass., Chicopee**—TRADE SCHOOL—BA 8/29—City, 135 Grape St., Trade School. $2,000,000. Plans deposit $25. Henry J. Tessier, 220 Dwight St., Springfield, archt. Joseph A. Nowak, 9 Andrews St., Springfield, mechanical engr. CD 5/22/58.

BUILDINGS—SLC

Mass., Brookline — SCHOOL — Maimonides School, 98 Washington St., Boston, soon lets contract high school and auditorium, Philbrick Rd. Extended date. $700,000. Hugh Stubbins & Assoc., 806 Mass. Ave., Cambridge, Mass., archts. CD 7/25.

BUILDINGS—LB & CA

▲† **Urban Constr. Co.,** 2 Lafayette St., New York, N. Y., LB $7,782,000, 480 unit Capehart HOUSING, Dow Air Force Base, IFB 17-601-60-37, BANGOR, ME. Base Procurement Office, Dow Air Force Base, Bangor, Me. Bids Aug. 4. CD 8/1.

▲ **Ralph Richard Constr. Co.,** 495 Waking Ave., Dedham, Mass., LB Subdivision A $1,563,238, LB Subdivision B $316,409, LB Subdivision C $1,878,600 HOUSING, Pro,. Mass. 34-1, NORTH ADAMS, MASS. City Housing Auth., 30 Catherine St., North Adams, Mass. Bids Aug. 4. CD 7/7.

▲ **Paine-LeCave Co.,** 372 Winter St., Waltham, Mass., Owner Builds, Approx. $1,200,000, three 3 story APARTMENTS, Lexington St., WALTHAM, MASS. Charles L. Quigg, Jr., 680 Main St., Waltham, Mass., archt.

▲ **Donatelli Constr. Co.,** 118 Cottage Ave., North Providence, R. I., CA $1,144,105, ELEMENTARY SCHOOL and RECREATION CENTER, Danforth St. and Camden Ave., PROVIDENCE, R. I. City, City Hall, Providence, R. I. Awarded Aug. 2. CD 7/15.

▲ **E. Tureon Constr. Co., Inc.,** 42 Weybosset St., Providence, R. I., CA $1,888,890, Dexter Manor HOUSING for ELDERLY, PROVIDENCE, R. I. City Housing Auth., City Hall, Providence, R. I. Bids July 19. CD 7/21, under LB.

Monaco Constr. Co., 104 Reservoir Ave., Bridgeport, Conn., CA $831,200, 90-unit HOUSING for elderly, Second Section, Fireside Apartments, BRIDGEPORT, CONN. Bridgeport Housing Auth., 252 Hallett St., Bridgeport, Conn. CD 8/3, under LB.

Heywood-Robinson Co., Inc., 114 Liberty St., New York, N. Y., CA $600,000, design and construct 60,000 sq. ft. multi-level, steel, concrete RAMP GARAGE, Church St., Hartford, Conn. Resolute Investment Corp., 75 Pratt St., Hartford, Conn. Awarded Aug. 5.

A. F. Peaslee, Inc., 37 Lewis St., Hartford, CA $889,598, Contr. E 60-397, FOUR FIRE HOUSES, Franklin Ave., Sisson Ave., Affleck St., Clark St., HARTFORD, CONN. City, City Hall, Purch. Agt., Hartford, Conn. Awarded Aug. 2. CD 7/26.

Douglas E. Dahm Co., Middle Rd., Farmington, Conn., CA $731,686, Academy School conversion to JUNIOR HIGH SCHOOL, GLASTONBURY, CONN. Town of Glastonbury, P. Bldg. Comn., Main St., Glastonbury, Conn. Awarded Aug. 1.

▲ **Fusco-Amatruda Co.,** 59 Amity Rd., New Haven, Conn., CA $4,873,000, (6 bidders), 7 story, 118 x 696 ft. GARAGE, 1 story RETAIL STORES, Temple St., Church St. Redevelopment Proj., NEW HAVEN, CONN. City of New Haven, Purch. Agt., 200 Orange St., New Haven, Conn. CD 7/29.

▲ **P. Francini & Co., Inc.,** Water St., Derby, Conn., LB $1,188,000, (7 bidders), HIGH SCHOOL, SEYMOUR, CONN. Town of Seymour, School Bd. Comm., Second St., Seymour, Conn. CD 7/15.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **D. C., Wash**—BA 8/31—D. C. Govt., Dpt. Highways, 499 Pennsylvania Ave. N. W., Southwest Freeway Inner Loop, 7th St. to 11th St. Plans deposit $50. Gannett, Fleming, Corddry & Carpenter, 700 N. Front, Harrisburg, Pa., engrs. CD 10/8.

BUILDINGS—BA

▲ **N. Y., Buffalo**—INDUSTRIAL AND FINE ARTS—BA 9/7—State Dpt. P. Wks., State Office Bldg., Albany, general contract heating, sanitary, electric and elevator, Industrial and Fine Arts, State University of New York College of Education. $4,000,000. Plans deposit $50 general, $30 each heating and electric, $20 sanitary, and $15 elevator. Kideney, Smith & Fitzgerald, 220 Delaware, archts. CD 1/24/57.

▲ **N. Y., New York**—SCHOOL—BA 9/8—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4 Fl., 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures P.S. 161, W. 133 St. between Amsterdam and Convent Aves., Manhattan Boro. Plans deposit $25 general, $10 each mechanical trades. CD 1/25.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 8/4,

S. J. Groves & Sons, Woodbridge, N. J., LB $1,196,067 (6 bidders), dualizing 4 mi. Rte. US 40, Upper Penns Neck Twp., Salem Co. CD 7/18.

▲ **PENNSYLVANIA**—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg, Bids opened 8/5,

Pa.—**Ralph Myers Contg. Corp.,** P.O. Box 125, Pitcairn, Pa, LB $4,859,034, (7 bidders), 9,898 ft. divided c. conc. hy., 6 bridges, Churchill Boro, Wilkins-Penn. Twps., Allegheny Co.;

Pa.—**Nello L. Teer Co.,** 212 W. Main St. Trust Bldg., P.O. Box 1131, Durham, N. C., LB $6,380,012, (10 bidders), 14,865 ft. divided c. conc. hy., 14 bridges, Washington City, N. Franklin, Canton and S. Strabane Twps., Washington Co.;

Pa.—**Adam Eidemiller, Inc.,** R.D. 4, Greensburg, Pa., LB $2,221,142, (10 bidders), 25,711 ft. divided c. conc. hy., 3 bridges, Perry and Rostrayer Twps., Fayette and Westmoreland Counties;

Pa.—**Foster Grading Co.,** R.D. 2, Jackson Center, Pa., LB $972,976, (4 bidders), 168,586 ft. paving shoulders with 6 in. soil cement or 6 in. soil bit. base and 2 in. bit. surface, variable in width on Erie Throughway, LR 797(12), Interstate Rte. 90, Springfield, Girard, Fairview, McKean, Greene, Millcreek, Harbor Creek, Greenfield and Northwest Twps., Platea Boro, Erie Co.;

Pa.—**New Enterprise Stone & Lime Co., Inc.,** New Enterprise, Pa., LB $988,474, (2 bidders), 17,087 ft. divided hy. of plain c. conc. base with bit. surf., 5 bridges, Altoona City, Logan Twp., Blair Co.;

Pa.—**H. J. Williams, Inc.,** 150 S. Sumner St., York, Pa., LB $2,711,113, (9 bidders), 23,600 ft. divided c. conc. hy., 6 bridges, Robeson Twp., Berks Co. CD 7/14.

Forrest Co., Mechanicsburg, Pa., CA $754,745, sanitary sewerage system, PENNDELL, PA. Penndell Municipal Authority, Penndell, Pa. Glace & Glace, 2771 Paxton St., Harrisburg, Pa., engrs.;
William H. Gill, Jr., 525 Mildred Ave., Primos, Pa., CA $119,970, sewage pumping station, (Penndel, Pa.).

BUILDINGS—LB & CA

▲ **Polera Bldg. Corp.,** 100 Soier Rd., Scarsdale, N. Y., LB $2,132,000, (6 bidders), general contract 146,000 sq. ft. SECONDARY SCHOOL, 5 Bldgs., Woodlands Secondary Education Center, GREENBURGH, N. Y. Bd. Educ. School Dist. No. 8, Town of Greenburgh, 33 West Hillside Ave., White Plains, N. Y. Perkins & Will, 55 Church St., White Plains, N. Y., archts. Seeley, Stevenson, Value & Knecht, 101 Park Ave., New York 17, N. Y., structural engrs. Segner & Dalton, 55 Church St., White Plains, N. Y., mechanical engrs.

▲ **Stewart M. Muller Constr. Co., Inc.,** 47 S. Riverside Ave., White Plains, N. Y., LB Est. $2,500,000, (8 bidders), 2 story DINING HALL, AUDITORIUM, TARRYTOWN, N. Y. Marymount College, Tarrytown, N. Y. Bids Aug. 2. CD 7/28.

▲ **Larchmont Constr. Co.,** Falls Church, Va., Separate Contracts, $4,250,000, RESIDENTIAL DEVELOPMENT, 250 houses, Knollwood Development, CAMDEN, N. J.

▲ **Klein Development Corp.,** c/o 1421 Nottingham Way, Trenton, N. J., Separate Contracts, $1,250,000, 100 HOUSES, Crestwood East Development, Hamilton Twp., TRENTON, N. J.

▲ **Reisinger Brothers, Inc.,** East North St., Carlisle, Pa., LB $1,327,700, general contract Central Dauphin East HIGH SCHOOL, Rutherford Rd. at Londonderry Rd, Lower Paxton Twp., HARRISBURG, PA. Central Dauphin School Dit. Authority, 4600 Locust Lane, Harrisburg, Pa. Bids Aug. 2. CD 7/13.

Summit Realty Co., 69th and Walnut Sts., Upper Darby, Pa., Separate Contracts, $935,000, RESIDENTIAL DEVELOPMENT (105), Sedley St., etc., PHILA., PA. Erling Wenge, 69th and Market Sts., Upper Darby, Pa., archts.

▲ **T. N. Luz Associates,** Eddington, Pa., Separate Contracts, $1,320,000, RESIDENTIAL DEVELOPMENT (44), Rineville Rd., etc., YARDLEY, PA.

▲ **Harvey Kayne of Maryland City Corp.,** 30 Baltimore Annapolis Blvd., Glen Burnie, Md., Owner Builds, $100,000,000 (ultimate), $15,000,000 first year est., Maryland City NEW COMMUNITY of 5,000 HOMES and related facilities, Anne Arundel and Prince George Counties, near LAUREL, MD. Hyman & Flowers, 2622 Maryland Ave., Baltimore 18, Md., archts. John E. Harms, Jr. & Assoc., 8 Crain Hy., Glen Burnie, Md., engrs.

▲ **Blake Constr. Co.,** 33 East St. S.W., Wash., D. C., CA Total est. $2,900,000, 256 unit APARTMENT 6 N and 6 S between 4th and 6th and K and M Sts. S.W.; CA Est. $1,250,000, 50 HOMES, first section town houses, north of M St. S.W., WASH., D. C. Webb & Knapp National Corp., 1012 14th St. N.W., Wash., D. C. I. M. Pei & Assoc., 385 Madison Ave., New York, N. Y., archts. CD 10/22/59 and 5/2/60.

▲ **E. I. du Pont de Nemours & Co.,** du Pont and Nemours Bldg., Wilmington, Del., Owner Builds, $9,000,000, NYLON PLANT modernization, expanion, SEAFORD, DEL.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**West of Mississippi**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported n low bidder stage.
CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

SOUTH

BUILDINGS—BA

▲ **Va., Blacksburg**—FIELDHOUSE—BA 8/30—Virginia Polytechnic Institute, S. K. Cassell, bus. mgr., fieldhouse. $1,500,000. Carneal & Johnston, 602 W. Cary St., Richmond, archts. CD 2/4/55.

HEAVY CONSTRUCTION—LB & CA

▲† **Arthur G. McKee & Co.,** 2300 Chester St., Cleveland, O., CA Est. $15,000,000, Rocket and Missile Fuel Plant, SALTVILLE, VA. Dpt. Air Force, Pentagon, Wash., D. C. Olin Mathieson Corp., 460 Park Ave., New York 22, N. Y. will operate. CD 5/4.

▲ **FLORIDA**—State Road Dpt., Tallahassee.

Industrial Contg. Co., P.O. Box 2307, Ft. Lauderdale, Fla., CA $2,587,460, 4 lane concrete deck bridge, etc. over Caloosahatchee River, Fort Meyers, SP 12010-3504, Rte. 45 (US 41), Lee Co. Bids July 26, awarded Aug. 8. CD 8/1/60, under LB.

▲ **ALABAMA**—State Hy. Dpt., Montgomery 4, Bids opened 7/29,

Ala.—**Rogers Bridge Co., Inc.,** Waycross, Ga., LB $420,688, bridges from Browder St. in Eufala north on US 431, incl. Spur on US 82, Prop. B, Barbour Co.; LB $420,688, bridges, grade separation structures, near Lee Co. line to Ga. State line on Int. 85, Chambers Co.; LB $180,744, bridges 0.057 mi. and 309.5 lin. ft. grade separation structures, on Rd. from Cano Creek northeast to Attilla on Int. 59, Etowah and St. Clair Counties; LB $258,152, bridges and grade separation structures, relocation US 78, Alden south east to Birmingham, Jefferson Co.;

Ala.—**Blount Bros. Constr. Co.,** 79 Commerce St., Montgomery, Ala., LB $724,026, superstructures, 0.195 mi., bridge over Sipsey River on Jasper-Addison Rd., Winston Co.;

J. H. Jenkins, Inc., Box 1282, Baton Rouge, La., LB $965,969, (5 bidders), Contr. CSD-S2, sanitary trunk sewers, Staring Lane and Essen Lane from Highland Rd. to north side of Ward Creek, BATON ROUGE, LA. City, Parish Council, Baton Rouge, La. Parsons, Brinckerhoff, Quade & Douglas, 233 St. Ferdinand St., Baton Rouge, La., engrs. CD 6/22/50.

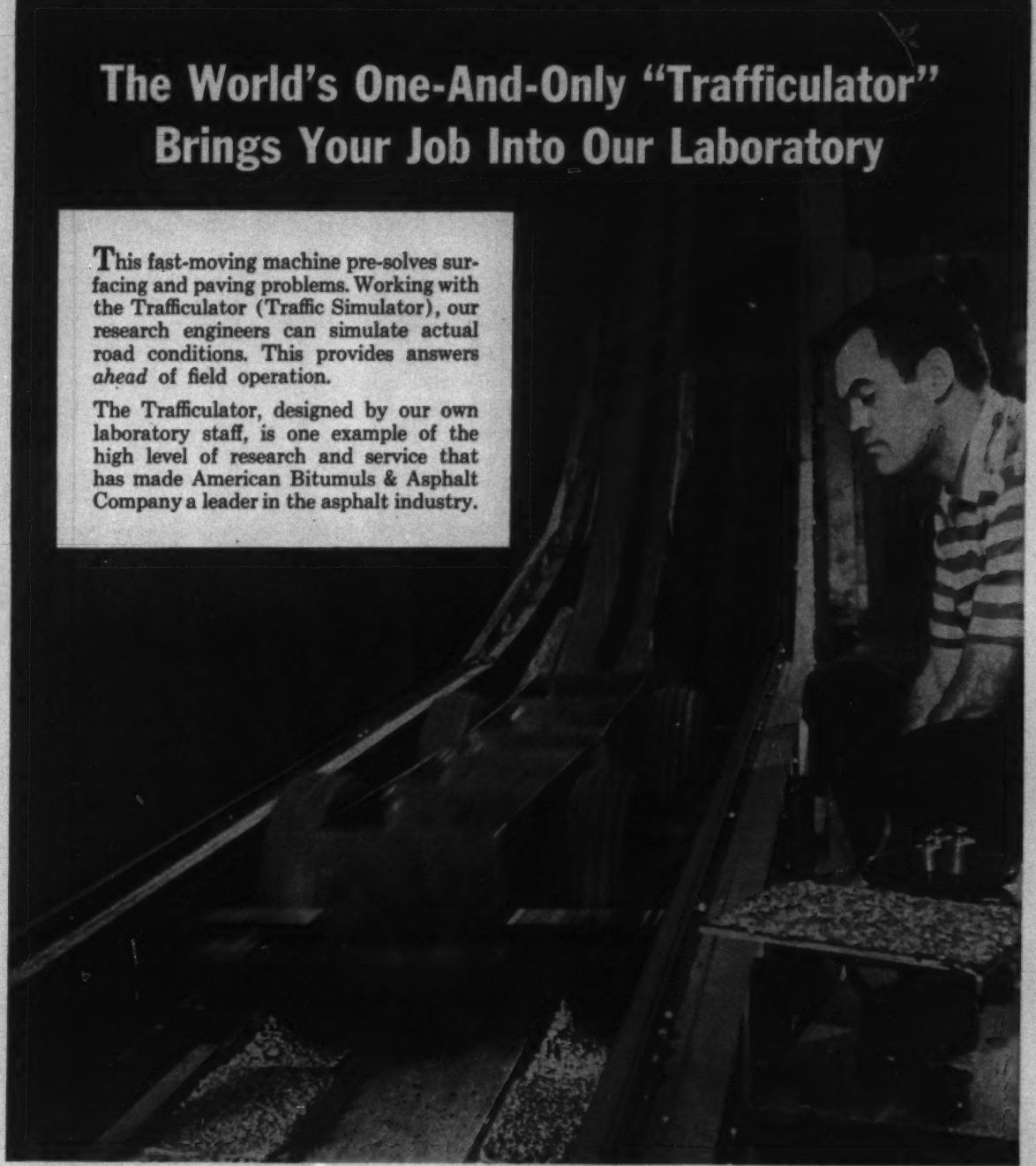
▲† **Bauer Dredging Co.,** P. O. Box BB, Port Lavaca, Tex., CA $1,131,060 hydraulic dredge disposal of

(Continued on page 100)

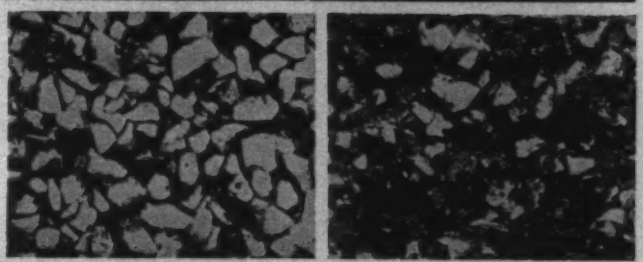
The World's One-And-Only "Trafficulator" Brings Your Job Into Our Laboratory

This fast-moving machine pre-solves surfacing and paving problems. Working with the Trafficulator (Traffic Simulator), our research engineers can simulate actual road conditions. This provides answers *ahead* of field operation.

The Trafficulator, designed by our own laboratory staff, is one example of the high level of research and service that has made American Bitumuls & Asphalt Company a leader in the asphalt industry.



Trafficulator Tests Prove Cationic Bitumuls Reduces Loss of Siliceous Cover Stone



After 1,000 passes by the Trafficulator, cover stone retention on the Cationic panel (left) is 70% better (by weight) than on the panel prepared with regular grade emulsion.

American Bitumuls & Asphalt Company
320 Market St., San Francisco 20, Calif.

Perth Amboy, N. J. · Baltimore 3, Md. · Cincinnati 38, Ohio · Atlanta 8, Ga. · Mobile, Ala. · St. Louis 17, Mo. · Tucson, Ariz. · Portland 8, Ore. · Oakland 1, Calif. · Inglewood, Calif. · San Juan 23, P. R.

BITUMULS® Emulsified Asphalts • CHEVRON® Paving Asphalts
LAYKOLD® Asphalt Specialties • PETROLASTIC® Industrial Asphalts

Neenah Foundry Company Plant No. 2, in production now

Neenah Announces.....

.... the full-time operation of plant No. 2. The production from this 150,000 square feet facility increases our daily maximum capacity to 500 tons of Gray Iron and Ductile Iron CASTINGS.

Informative and fully illustrated 168-page catalog will be sent promptly upon request.

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Kinnear Rolling Grilles

They block any doorway with an attractive "open" appearance! And without blocking off air, light or vision. Like Kinnear Rolling Doors, the steel-bar-and-link grilles coil above the opening when not in use. No space wasted! Motor control if desired. Built to fit any door, window, or other opening. Write for free catalog!

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IT'S VERSATILE...
ideal for preliminary and supplementary surveying; used as a compass, transit, level, plumb, alidade, clinometer. Shows direction to 1°; level, slope or grade within 1°.

IT'S MADE TO LAST A LIFETIME
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See your local engineering supply house or WRITE FOR CATALOG

**Brunton is a registered trademark of*

WM. AINSWORTH & SONS, INC.
2151 LAWRENCE ST. • DENVER 5, COLORADO

(Continued from page 98)

8,400,000 cu. yd. material Mississippi River-Gulf Outlet, St. Bernard Parish, CIVENG-16-047-70-228, LOUISIANA. U. S. Eng., P. O. Box 267, New Orleans, La. Bids July 14. CD 7/26, under LB.

▲ **Oman Constr. Co.**, P. O. Box 146, Nashville, Tenn., CA Est. $1,500,000, First Phase, grading, draining DeCoursey Yards modernization, DeCOURSEY (P.O. COVINGTON), KY. Louisville & Nashville RR, 9 and Broadway, Louisville, Ky. CD 8/3.

Standard Engineering Co., 1743 Western Ave., P. O. Box 5052, Albany 3, N. Y., CA $771,666, general overhaul and repairs of Shelby Street bridge across Cumberland River, NASHVILLE, TENN. City, City Hall, Nashville, Tenn. Awarded Aug. 1.

BUILDINGS—LB & CA

▲ **Gust. K. Newburg Constr. Co.**, 99 NE 71st St., Miami, Fla., LB Approx. $10,000,000, (6 bidders), Newspaper PLANT, NE Bayshore Place and 13th St., MIAMI, FLA. Miami Herald Publishing Co., 200 S. Miami Ave., Miami, Fla. Naess & Murphy, 1428 NE Bayshore Place, Miami, Fla., and 224 S. Michigan Ave., Chicago, Ill., archts.-engrs. Bids July 19. CD 7/13;

Raymond Concrete Pile Co., 2505 Ponce DeLeon Blvd., Coral Gables, Fla., LB Approx. $750,000, (7 bidders), newspaper plant foundation, NE Bayshore Place and 13th St., (Miami, Fla.).

M. & S. Constr. Co., Truitt Station, Corinth, Miss., CA $775,703, 1 and 2 story, 97,500 sq. ft. steel frame, concrete, etc. SPACE PLANT, CORINTH, MISS. Bd. Supervs. Alcorn Co., Corinth, Miss. John L. Turner & Assocs., Petroleum Bldg., Jackson, Miss., archts. Kellogg Mfg. Co., lessee.

Leo C. Miller Co., 333 East Bloom St., Louisville, Ky., LB $721,000, 4 story, 50,000 sq. ft. brick, rein.-con. mens DORMITORY, Western State College, BOWLING GREEN, KY. Commonwealth of Ky., Div. Purchases, Frankfort, Ky. Bids Aug. 4. CD 7/25.

▲ **Thompson & Street**, P. O. Box 1474, Charlotte, N. C., LB $1,937,400, (5 bidders), 192 unit low-rent HOUSING, CHATTANOOGA, TENN. Chattanooga Housing Authority, Chattanooga, Tenn.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **Ill., Chicago**—LIGHTING—BA 8/23—Dpt. Purchases, City Hall, Zone 2, No. 80.64-60-3, street lighting, About $3,000,000. CD 11/10.

BUILDINGS—BA

▲ **Wis., Brookfield**—SCHOOL—BA 9/8—Union Free High School Dist., Lilly Road High School. Plans deposit $100. Grassold-Johnson & Assocs., 734 N. Jefferson St., Milwaukee, engrs. CD 8/5.

HEAVY CONSTRUCTION—LB & CA

▲ **Rocco Ferrara & Co., Inc., and Bona Co., Inc.**, 30105 W. 8 Mile Lane, Livonia, Mich., LB $4,892,985, (2 bidders) Mahoning River Interceptor Sewer and Red Run diversion conduit, WARREN, O. City, City Hall, Warren, O. Bids Aug. 1. CD 5/24, under LB.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, Bids opened 8/5,

Ill.—**Robert R. Anderson Co.**, 4450 W. Patterson St., Chicago, Ill., LB $546,288, (8 bidders), grade separation St. Charles Rd. over FAI 90 at Elmhurst, Cook and DuPage Counties;

Ill.—**Fruin-Colnon Co.**, 1706 Olive St., St. Louis, Mo., LB $1,008,596, (3 bidders), grade separation, Exchange Ave. over East St. Louis Expressway, FAI 70, St. Clair Co.;

Ill.—**McCann & Co.**, P.O. Box 201, Springfield, Ill., LB $653,844, (7 bidders), two grade separation structures FAI 70 over Railroad near Fairmont City, Madison Co. CD 7/21.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, Bids opened 8/5,

Ill.—**Triangle Constr. Co.**, 480 N. Evergreen St., Kankakee, Ill., LB $1,295,743, (4 bidders), paving, grade separation FAI 57 under local roads north of Bradley, Kankakee Co.; LB $260,858, (5 bidders), resurf. 0.56 mi. FA 37, West Frankfort, Franklin Co.;

Ill.—**McDougal-Hartman Co.**, 3101 N. Adams St., Peoria, Ill., LB $1,006,582, (3 bidders), paving, ramps, grade separation, Morton Ave. over FAI 74 north of Morton, Tazewell Co.; LB $758,270, (3 bidders), base course, resurf. 8.4 mi. Ill. 94 from east of Aledo, Mercer Co.;

Ill.—**Arcole Midwest Corp.**, 3225 Main St., Evanston, Ill., LB $894,923, (1 bidder), intersection Imprv. Ill. 21 with Golf Rd., Cook Co.;

Ill.—**Robert A. Black, Inc.**, 13912 S. Halsted St., Chicago, Ill., LB $1,322,603, (5 bidders), concrete base course 1.98 mi. Ill. 50, Chicago, Cook Co.;

Ill.—**Eric Bolander Co.**, Winchester Rd., Libertyville, Ill., LB $1,013,576, (6 bidders), paving 6.83 mi. US Alt. 30 from DeKalb east, DeKalb Co.;

Ill.—**Contracting & Material Co.**, 1235 Dodge Ave., Evanston, Ill., LB $744,165 (7 bidders), c. conc. paving 3.28 mi. FAS 116 from Palatine east, Cook Co.;

Ill.—**S. J. Groves & Sons**, 1104 E. Reynolds St., Springfield, Ill., LB $1,435,269 (4 bidders), grading 2.42 mi. FAI 70 near Collinsville, Madison Co.;

Ill.—**Hoeffken Bros., Inc.**, 222 W. B St., Belleville, Ill., LB $1,255,381 (5 bidders), earth grading 0.39 mi. FAI 270 near Mitchell, Madison Co.;

(Continued on page 104)

ALLIED Jet Seal on the job at

NIAGARA

THE WORLD'S GREATEST POWER PROJECT

Allied JET SEAL (Hydraulic Product 9015-T-1) is the specified concrete conduit sealant for the $850 million Niagara Power Project.

The twin, giant conduits—66 feet high and 44 feet wide—are a major part of this New York State Power Authority project that will supply nearly two million kilowatts of electricity to New York, Pennsylvania and Ohio.

Allied JET SEAL was chosen as the preferred sealant for the conduit domes because of its superior application, adhesion, rapid curing time and long life.

ALLIED JET SEAL APPLIED ROUND THE CLOCK . . . IN ALL WEATHER

At Niagara crews are applying Allied JET SEAL to the reinforced concrete conduits along three longitudinal and regular transverse joints of the arched dome cover (see photo above).

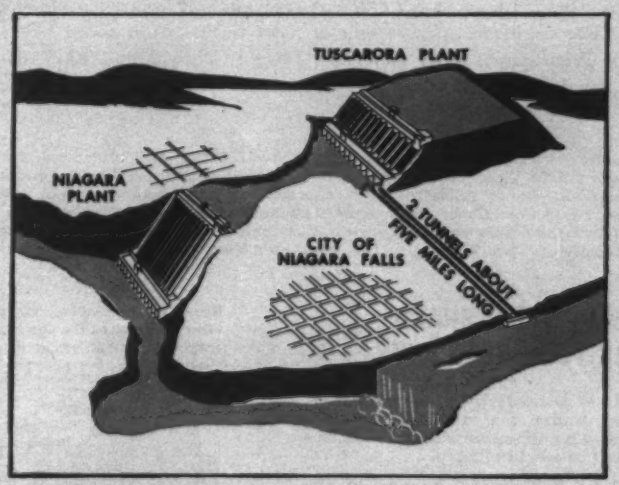
Laid in trenches as deep as 180 feet, the conduits will be covered with fill so that the surface can be utilized. The dome of the conduits must be strong enough to support this weight and tight enough to contain the water. Allied JET SEAL's outstanding resiliency and tough waterproofing qualities help make this possible.

The two-component, polysulfide-based sealant is applied after sand-blasting of the concrete joints. Upon curing it develops a tight bond with the concrete interface of the joint. It remains resilient and able to absorb contraction and expansion without cracking or breaking away from the joint.

Application is done with specially equipped rigs (shown above) capable of applying JET SEAL at 90°F in all kinds of weather. The primary unit in this set-up is the special JET SEAL Applicator, originated and manufactured by Allied.

Where a superior joint sealant is called for—as at Niagara—Allied JET SEAL is ready to meet and TOP the specifications. It is in use now on many major projects throughout the country: Hydraulic (JET SEAL 9015-T) Highway (JET SEAL 9015-H) Military (JET SEAL 9015-M).

For more of the story of Allied JET SEAL, the Superior joint sealant, write:



Allied JET SEAL Protects 82,000 Feet of Concrete Conduit

The twin conduits where Allied JET SEAL is being used (shown in red) stretch from the in-take facility (lower right) to the open canal. This diverted water is then lifted by pumps into the reservoir above the Tuscarora Station.

Released from the reservoir, the water drops through penstocks into scroll cases to fuel Tuscarora's turbine generators. From there it flows down the canal to Niagara Station to perform the same service. From Niagara Station the water is returned to the river.

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS FOR OVER 27 YEARS

ALLIED BUILDING • 5101 N. PENNSYLVANIA • P. O. BOX 7103 39th Street Station • Oklahoma City, Oklahoma
Plants: Stroud, Okla. • Detroit, Mich. • Los Angeles, Calif.

80 miles of USS Tiger Brand Guy Lines support towers of nation's most powerful radio station

The 26 skyscraping radio towers at the Naval Transmitting Station near Cutler, Maine will be braced to withstand a wind velocity of 170 mph and a three-inch ice accumulation. Two of the towers will soar up to 980 feet, twelve will reach a height of 875 feet and twelve will be 800 feet high.

Each triangular tower will be guyed at four levels by a total of 24 galvanized steel wire bridge strands ranging in size from 1" to 3⅛" in diameter, and from 281 feet to 1,271 feet in length. More than 80 miles of these steel muscles weighing close to 1,850 tons were produced at the Trenton Works of American Steel & Wire for the complete job.

The 26 towers are arranged in two arrays of 13 each and are a vital part of the Very Low Frequency radio installation which will support U. S. Navy submarine and surface operations in the North Atlantic and Arctic areas. When fully operational, it will be the most powerful radio station in the United States.

Engineers at American Steel & Wire have had vast experience with high-strength guy assemblies for towers like this and for even higher TV Towers. These strands were pre-stressed, proof-tested, measured, marked at a precise tension and fabricated to specified lengths for efficient erection and assured performance.

For engineering assistance or more information about USS Tiger Brand Guy Lines or Wire Rope, write American Steel & Wire, Dept. 0317, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS and Tiger Brand are registered trademarks

Some of the 26 towers being erected for the new U. S. Navy radio station near Cutler, Maine. Each tower is guyed with 24 USS Tiger Brand Galvanized Bridge Strand Assemblies. Photo shows method of anchoring guys with adjustable fittings. All design and construction under the general supervision of the U. S. Navy, Bureau of Yards and Docks. Prime Contractor: Continental Electronics Mfg. Company, Dallas, Texas. Tower Erection Subcontractor: John F. Beasley Construction Company, Muskogee, Oklahoma. Overall Design of Radiation System: Developmental Engineering Corp., Washington, D.C. Structural & Mechanical Design: Robert & Company Associates, Atlanta, Ga.

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1. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry.

2. It is designed by one of the country's most capable staffs of wire rope engineers. It is serviced by thoroughly experienced field representatives always ready with their assistance.

3. Every type of Tiger Brand Wire Rope is designed for specific applications. You get the *right* rope for the job.

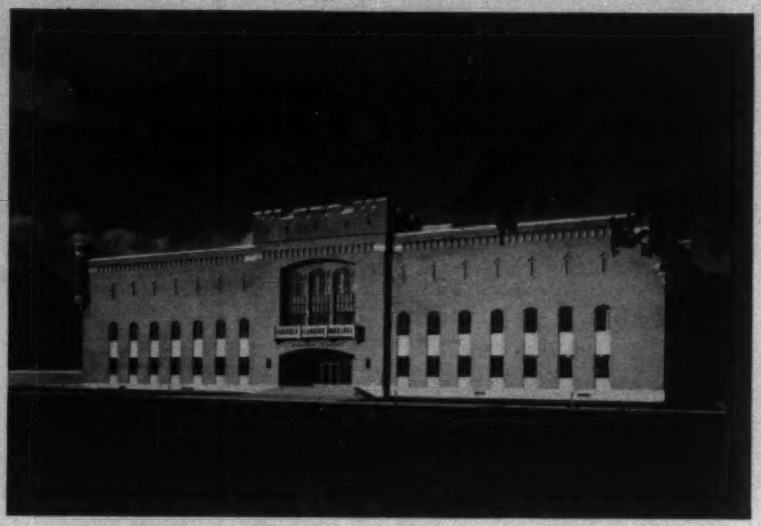
4. It is made by *one* company, U.S. Steel, and every step of production, from ore to finished product, is carefully controlled and supervised to guarantee *one* high standard of quality.

5. Tiger Brand Wire Rope is manufactured by the foremost single wire rope producer in the country.

Reeled for efficient erection, one of the 624 bridge strand assemblies receives the nod of approval from the Navy and the contractor as it arrives at the construction site.

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad



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(Continued from page 100)

Ill.—**Michael Pontarelli & John C. Tully Co.**, 33 N. LaSalle St., Chicago, Ill., LB **$4,608,731**, (5 bidders), storm sewers 3.01 mi. South Expressway, Cook Co.;

▲ **Superior Concrete Constr. Co.**, 6949 S. Bennett Ave., Chicago, Ill., LB **$1,186,028**, est. $1,600,000, (12 bidders), No. 066-19.9 CF, 4-span continuous deck plate girder bridge, South Rte. and Wentworth Ave.; LB **$289,099**, est. $275,000, (10 bidders), No.-066-1313.3-CF 3-span hy. bridge, Stoney Island Ave. and South Rte. Expressway, CHICAGO, ILL. Bd. Comrs. Cook Co., County Bldg., Chicago 2, Ill., Bids Aug. 2, CD 7/21;

Thomas McQueen Co., 1313 Circle Ave., Forest Park, Ill., LB **$426,030**, est. $520,000, (7 bidders), No. 066-1213-CF, two prestressed precast concrete hy. bridges, 103rd St. and South Rte. Expressway; (Chicago, Ill.);

Eric Bolander Constr. Co., Winchester Rd., Libertyville, Ill., LB **$221,045**, est. $300,000, (8 bidders), No. 100-1719.1-MFT 3-span concrete bridge, Lake Cook Rd. and Des Plaines River, Northbrook, (Chicago, Ill.);

J. M. Corbett Co., 2500 S. Corbett St., Chicago, Ill. LB **$709,417**, est. $410,000, (5 bidders), 066-1920-CF 5-span concrete hy. bridge, (Chicago, Ill.);

Mt. Vernon Steel Co., Mt. Vernon, O., LB **$618,530** est. $640,000, (5 bidders), No. 066-1414.7F-CF, structural steel for bridge (Chicago, Ill.);

E. J. Albrecht Co., 2626 W. 26th St., Chicago, Ill., LB **$1,568,731**, est. $1,480,000, (9 bidders), No 066-1314-CF and 066-1414.7-CF, 3 span deck girder railroad bridge, 3-span concrete hy. bridge, Cottage Grove Ave. and I.C. RR (Chicago, Ill.);

R. R. Anderson Co., 4550 W. Patterson St., Chicago, Ill. LB **$751,205**, est. $500,000, (9 bidders), No. 066-1919. 4-4-CF, 3-span precast prestressed concrete hy. bridge, 3,455 ft. 8 to 42 in. storm sewers, Marquette Rd. (Chicago, Ill.);

Kenny Constr. Co., 3220 Oakton St., Skokie, Ill., LB **$976,759**, est. $530,000, (9 bidders), No. 066-1919. 5-CF 5 simple span concrete hy. bridge, South Rte. and 69th St., (Chicago, Ill.) CD 7/21.

▲ **WISCONSIN**—State Hy. Comn., Constr. Section, Rm. 535, State Office Bldg., Madison, Bids opened 8/2,

Wis.—**L. G. Arnold, Inc.**, P.O. Box 228, Eau Claire, Wis., LB **$1,003,991**, concrete 6.44 mi. Proj. I 90-2 (25)111, Contract 1, Columbia Co.; LB **$423,586**, c. conc. 4.447 mi. Proj. F 06-2(19) and F 06-2(18), contract L, Dodge and Jefferson Counties; LB **$730,829**, c. conc. 4.885 mi. Proj. I 90-2(21)117, Contract 1, Columbia Co.; LB **$98,761**, grade, subbase, base course, 2.552 mi. Proj. S 019(7), Contract 1, Eau Claire Co.;

Wis.—**F. F. Mengel Co.**, Box 466, Wisconsin Rapids, Wis., LB **$761,550**, c. conc. 4.196 mi., Proj. I 90-2(21)117, Contract 2, Dane Co.;

Wis.—**The Kramp Constr. Co., Inc.**, 2765 S. 27th St., Milwkaukee 15, Wis., LB **$1,301,359**, base, c. conc. and b. conc. 1.002 mi. Proj. I 9404(52) 306, U 03-1(77) U-03-1(81) and U 03-1(82), Contract 1, Milwaukee Co. CD 7/8.

▲ **MICHIGAN**—State Hy. Dtp., 732 Mason Bldg., Lansing, Zone 26, Bids opened 8/3.

Mich.—**Pierson Contg. Co.**, 200 Eddy Bldg., Saginaw, Mich., LB **$977,091**, 4.8 mi. US 27 freeway, Crawford Co.;

Mich.—**Garavaglis, Lewis Contractors, Inc.**, 24240 Mound St., Warren, Mich., LB **$4,019,345**, 2.5 mi. roadway constr., 4 vehicular bridges, 2 pedestrian bridges, 4 storm water pump houses and utility alterations from point just south of Ford Rd. north to Westfield Ave., Southfield Freeway, Detroit and Dearborn, Wayne Co.;

Mich.—**Denton Constr. Co.**, 20415 Mack Ave., Grosse Pointe, Mich., LB **$909,818**, 4.4 mi. temporary three lane road between roadways of James Couzens and Northwester Hys., Oakland and Wayne Counties;

BUILDINGS—LB & CA

▲ **H. J. Spieker Co.**, 1418 Elm St., Toledo, O. CA Est. **$2,500,000**, CERAMIC PLANT expansion, CAMBRIDGE, O. Champion Spark Plug Co., 900 Upton St., Toledo, O.

W. A. Schuster, Inc., Ebenezer Rd., Cincinnati, O. Own Forces, **$785,000**, forty-six 1 story, bsmnt., 28x40 ft. brick HOUSES, Rockacres Court, CINCINNATI, O. Joseph M. Allen Co., 55555 Glenway Ave., Cincinnati, O., engr. Awarded Aug. 1.

▲ **F. X. Minnegan Inc.**, 14 Bates St., Dayton, O. CA Est. **$1,500,000**, 188,000 sq. ft. PLANT addn., DAYTON, O. McCall Corp., 2219 McCall St., Dayton, O. Lockwood Greene Engineering Co., 41 E. 42nd St., New York, N. Y., engr.

▲ **Allis-Chalmers Mfg. Co.**, 1126 S. 70th St., Milwaukee, Wis., CA three 33,000 kw. turbine generator units for 99,000 kw. POWER PLANT, South Fork Saline River, near Marion, ILLINOIS, Southern Illinois Power Cooperative, P. O. Box 689, Marion, Ill., CD 7/27.

The Elliott Co., Jeanette, Pa., CA, three 27,500 sq. ft. surf. condensers, for 99,000 kw POWER PLANT, South Fork Saline River, near Marion, (Illinois).

▲ **Bauer Bros. Constr. Co., Inc.**, 424 Lebanon Ave., Belleville, Ill., CA **$1,643,775**, WEST JUNIOR HIGH SCHOOL, Royal Heights Rd. between North Belt West and Rte. 161, ABRAHAM LINCOLN GRADE SCHOOL, Royal Heights Rd. adjacent to West Junior High School, BELLEVILLE, ILL. Belleville Elementary School Dist. 118, Bd. Educ., 700 Lucinda St., Belleville, Ill. Bids July 21, awarded Aug. 3. CD 7/27, under LB.

Otts Schulz & Son, 3114 Harrison St., Evanston, Ill., LB **$714,925**, Drake ELEMENTARY SCHOOL, 2117 S. Drake Ave., CHICAGO, ILL. Bd. Educ., 228 N. LaSalle St., Chicago 1, Ill. Bids Aug. 1. CD 7/14.

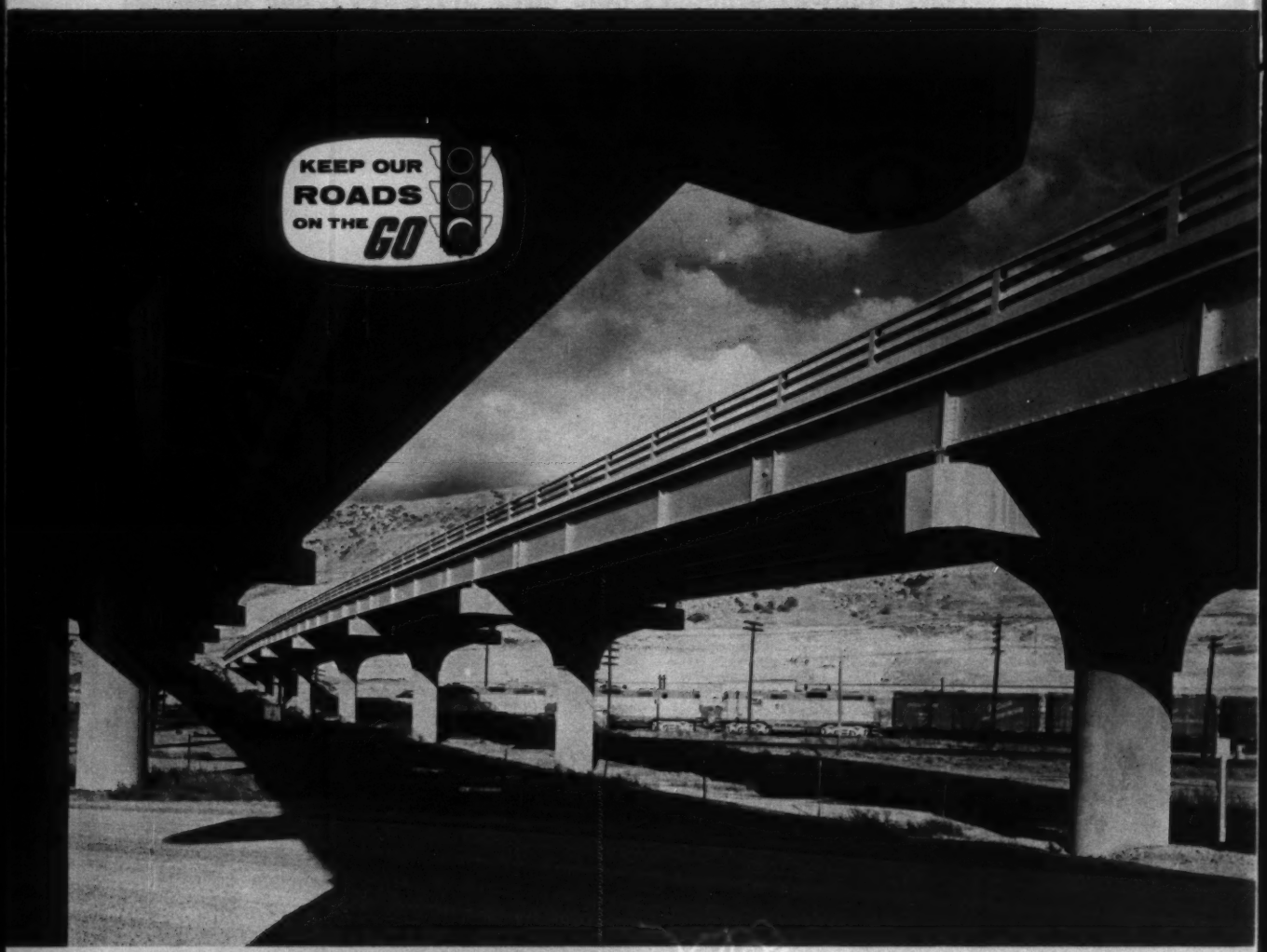
▲ **Permanent Constr. Co.**, 2200 N. 3rd St., Milwaukee, Wis., LB **$3,125,000**, (6 bidders), general contract

(Continued on page 108)

Interstate road program moves ahead in Utah

USS Highway products help pave the way . . . see inside

Utah's new Interstate road



There are almost 1½ million pounds of structural steel and 3,200 cubic yards of concrete in the Beck's Springs Overpass north of Salt Lake City. Design allows for expansion from four to six lanes. USS Structural Steel used here will withstand great abuse, effectively resist tension, torsion, compression and shear, and can be erected in any weather in which men can work because it's easy to rivet, weld or bolt. This bridge was fabricated and erected by the American Bridge Division of U. S. Steel.

Here USS Steel Sheet Piling is used as a retaining wall along the Salt Lake City Freeway. Nearly 44,000 square feet of steel sheet piling retain the fill next to adjacent property on the east side of the highway.

program moves ahead

USS Highway Products play a big part

Under the direction of C. Taylor Burton, Chairman of the State Road Commission, and Director of Highways Elmo R. Morgan, 965 miles of Interstate roads have been authorized in Utah. 40 miles have already been completed, 82 additional miles are now under construction. In addition, 66 of 600 planned bridges have been completed.

Highway products from U. S. Steel are playing a big part in Utah's new Interstate Road system. In the bridges, for instance, the strong USS Structural Steel being used is one of the most economical of load carrying materials. It is available for the construction of bridges of all types in a number of USS High Strength Steels as well as structural carbon steel. Other USS products include reinforcing bars in the bridges, AMERICAN Welded Wire Fabric in the roads, and high strength steels and wire rope in cranes and other machinery. For safety, U. S. Steel supplies signs, posts, guard rail and galvanized sheets for culverts.

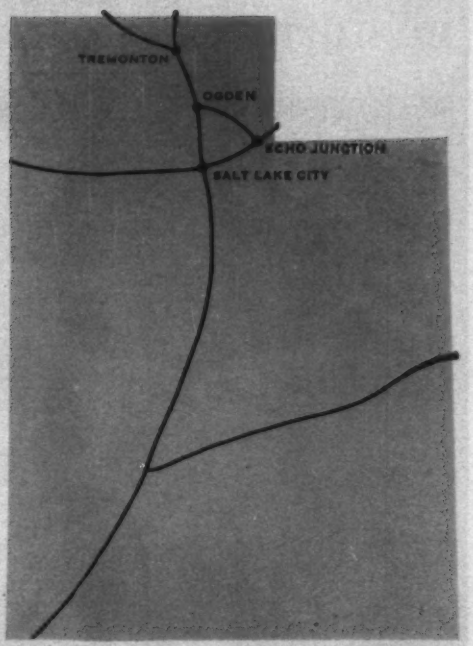
Approximately 1,600,000 cubic yards of blast furnace slag from Columbia-Geneva Steel Division of U. S. Steel will be used as embankment material on a new project recently awarded by Utah State Road Commission. Known as Interstate Highway Route 15, the project spans a 4.94-mile section where blast furnace slag will provide a stabilized embankment for the pavement and shoulder area.

USS, Di-Lok, Tiger Brand, and American are registered trademarks

Send for U.S. Steel's **free** *54-page booklet, "Keep Our Roads on the Go." It tells how the complete range of highway products and services available from U.S. Steel can cut costs and speed operations in every phase of highway construction. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.*

USS United States Steel

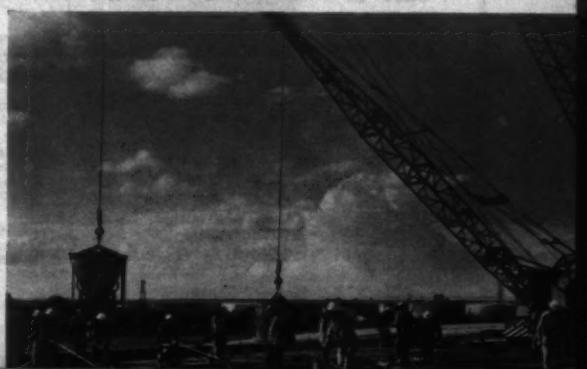
The highway market also is served by the following divisions of United States Steel: American Bridge Division, Pittsburgh, Pa. • American Steel & Wire Division, Cleveland, Ohio • Columbia-Geneva Steel Division, San Francisco, Calif. • Consolidated Western Steel Division, Los Angeles, Calif. • National Tube Division, Pittsburgh, Pa. • Tennessee Coal & Iron Division, Fairfield, Alabama • Universal Atlas Cement Division, New York • United States Steel Supply Division, Steel Service Centers, Chicago, Illinois.

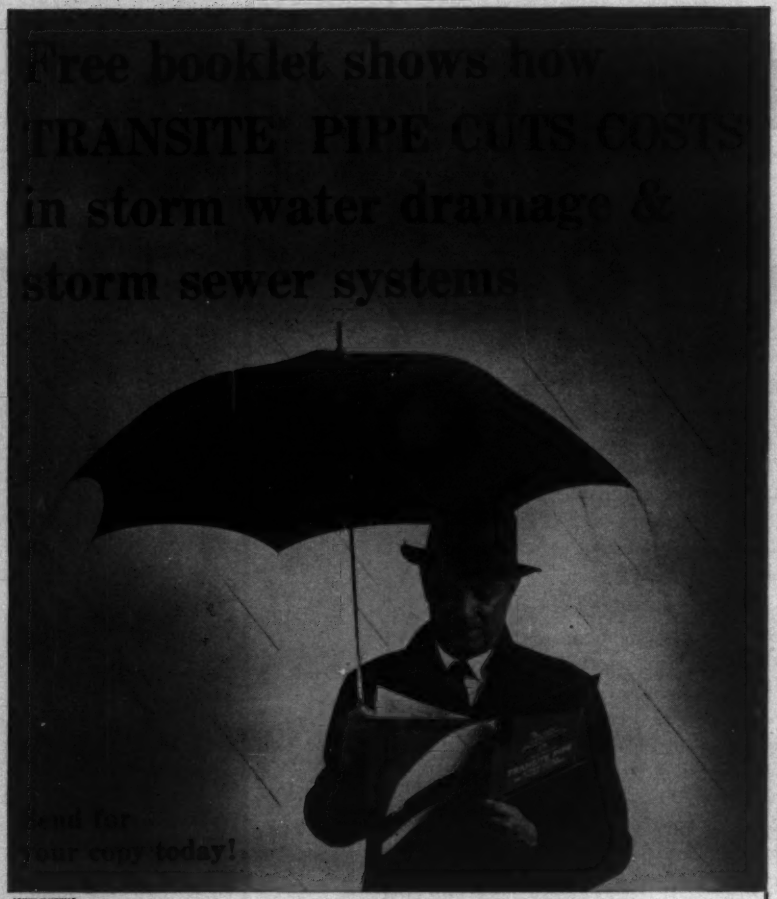


Map shows Utah's new Interstate highway network.

808 lineal feet of strong, long-lasting steel handrail gleam in the mountain sun on this bridge on the Davis Freeway near Bountiful, Utah. Steel products like these contribute to the safety of traffic on modern Interstate Roads.

USS Tiger Brand Wire Rope, seen here on these gigantic cranes, will lift heavy loads for a long time. The bridge is also being built to last, with the use of USS *Di-Lok* concrete reinforcing bars. STEEL, wherever you look—insures strong, long-lasting structures.





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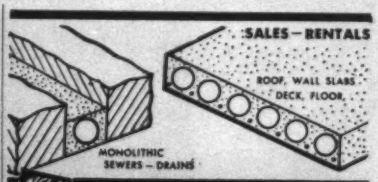
Lancaster, Penna.



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378 TEN EYCK ST., BROOKLYN, N.Y. HY 7-5445

(Continued from page 104)

MUSEUM, MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis., Bids Aug. 3, CD 6/27;
Zien Plumbing & Heating Co., 4450 N. Oakland Ave., Milwaukee, Wis., LB $593,333, heating and ventilating contract for MUSEUM, (Milwaukee, Wis.);
Reliance Electric Co., 2484 W. Fond du Lac Ave., Milwaukee, Wis., LB $427,437 electric contract for MUSEUM (Milwaukee, Wis.).

▲ **Becker Constr. Co.**, 7701 W. Blue Mound Rd., Milwaukee, Wis., CA $1,418,714, general contract SENIOR HIGH SCHOOL, OAK CREEK (South Milwaukee, P. O.) WIS. Bd. Educ., Oak Creek and Franklin Joint City School Dist. No. 1, 9330 S. Shepard Ave., Oak Creek, (South Milwaukee P. O.) Wis. Bids July 15. CD 7/27, under LB.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

Minn., Shakopee—BA 8/30—City, City Hall, sewage treatment plant and interceptor sewers. $750,000. Plans deposit $25. Toltz, King, Duvall, Anderson & Assocs., 1408 Pioneer Bldg., St. Paul, engrs. CD 7/6.

BUILDINGS—BA

▲ **Colo., Castle Rock**—SCHOOL—BA 8/24—School Dist. No. RE-1, 620 Wilcox, 1 story, Junior-Senior High School. $1,100,000. Wheeler & Lewis, 2215 W. 32nd Ave., Denver, archts.

Kan., Salina—SCHOOL—BA 8/24—Bd. Educ., Box 808, 2 story Senior High School addn. $825,000. Shaver & Co., 205½ S. Santa Fe, archts. Wilson & Co., 631 E. Crawford St., assoc. archts. CD 4/18.

Minn., Duluth—EDUCATION CLASSROOM—BA 8/30—Regents of the University of Minnesota, 404 Administration Bldg., Minneapolis, Zone 14, education classroom, Duluth Branch. $637,000. Plans deposit $15. Melander, Fugelso & Assocs., 603 Alworth Bldg., archts. CD 11/19.

▲ **Mo., Riverview Gardens (St. Louis 37 P.O.)**—SCHOOL—BA 8/30—School Dist. Riverview Gardens, 1370 Northumberland Dr., St. Louis, Zone 37, Junior High School, Hy. 67 and Northumberland Dr. $1,075,000. Manske & Dieckmann, 9945 Riverview Dr., St. Louis, Zone 36, archts. CD 2/16.

▲ **Tex., Dallas** — SCHOOL — BA 8/30 — Jesuit Fathers Faculty, 3813 Oak Lawn, high school, Inwood Road and Willow Lane. $1,000,000. George L. Dahl, 2101 N. St. Paul St., engr. CD 9/4.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul, Bids opened 8/5,
Minn.—Woodrich Constr. Co., 201 18 Ave. S., Hopkins, Minn., LB $1,647,131 (5 bidders), crushed rock base, plant mixed bit. surf. and concrete pavement 5.2 mi. near Dexter, Mower Co.;
Minn.—Ulland Bros., Inc., 2126 Water St., Duluth, Minn., LB $985,215 (4 bidders), gravel base, bit. base and plant mixed bit. surf. 0.1 mi. between Lynn Ave. and Bridge No. 9030, Duluth. CD 7/25.

BUILDINGS—LB & CA

Conlon Constr. Co., 240 Railroad Ave., Dubuque, Iowa, CA $950,000, DORMITORY, DUBUQUE, IOWA. Loras College, 1450 Alta Vista Ave., Dubuque, Iowa. William F. Bernbeck, Fifth Ave. Bldg., Moline, Ill., archt. CD 12/21.

▲† **S. S. Silberblatt, Inc.**, 25 West 45 St., New York, N. Y., CA $12,557,950, 800 units Capehart HOUSING, ENG-23-028-60-84, FORT LEONARD WOOD, MO. U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo. Bid May 13. CD 5/17, under LB.

▲ **M-P Constr. Co.**, 803 E. Central St., Carthage, Mo., CA LIQUID OXYGEN PLANT, site of former Camp Crowder Army Post, NEOSHO, MO. Linde Co., Div. Union Carbide Corp., 30 E. 42 St., New York, N. Y., and 712 E. 14 St., Kansas City, Mo. CD 10/20.

▲ **Westlake Constr. Co.**, 1919 Railway Exchange, 611 Olive St., St. Louis 1, Mo., CA Est. over $1,000,000, Y.M.H.A.-Y.W.H.A. RECREATIONAL FACILITIES, ADMINISTRATION BLDG. and CAMP SHELTER BLDG., COMFORT STATION, etc. Lindbergh Blvd. and Schustz Rd., ST. LOUIS COUNTY, MO. Jewish Community Centers Assn., 724 Union Blvd., St. Louis 8, Mo. Bids July 26. CD 7/21.

▲ **Brezina Constr. Co.**, 709 Steel St., Box 1592, Rapid City, S. D., CA $1,067,000, est. $1,500,000. CATHEDRAL, RAPID CITY, S. D. Catholic Diocese of Rapid City, 1622 W. Blvd., Rapid City, S. D. CD 8/3.

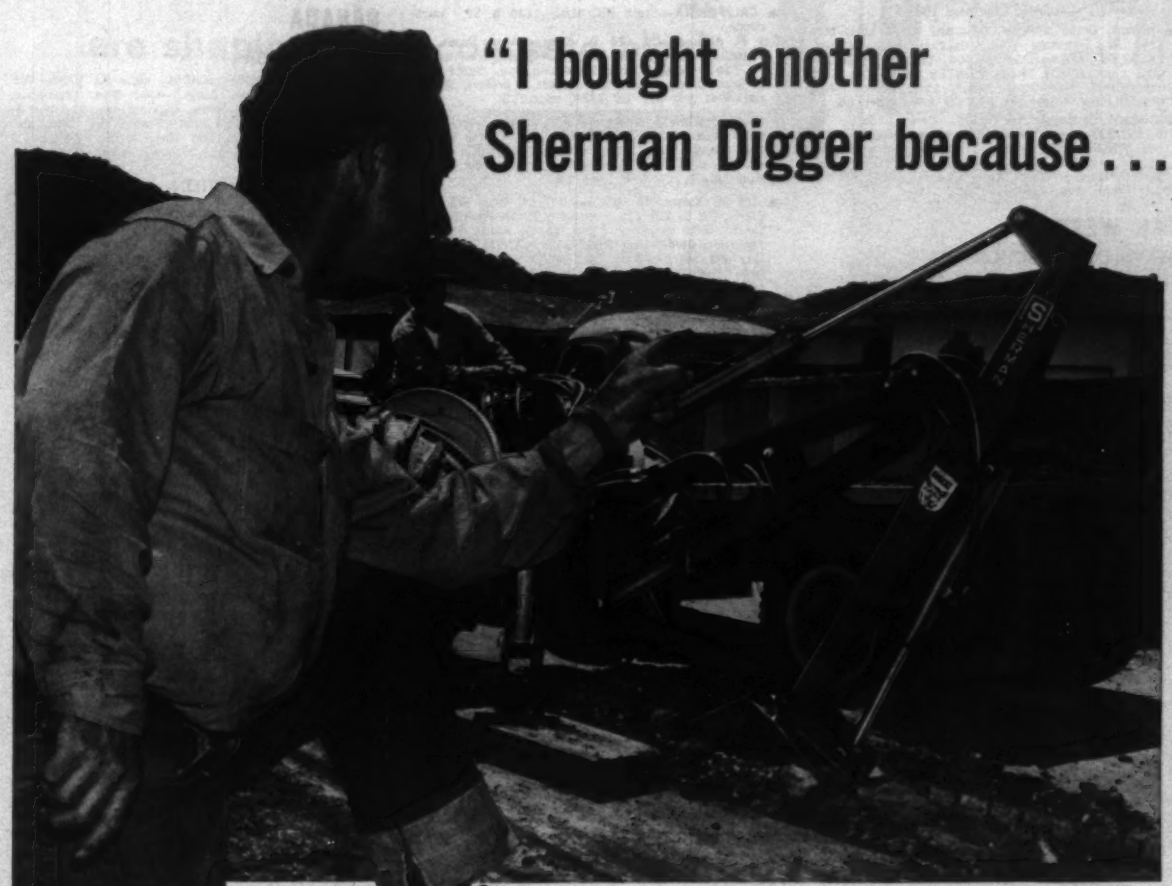
▲ **Kingery Constr. Co.**, 1941 Y, Lincoln, Neb., LB $1,371,420, general contract 3 story, bsmnt. Bryan HOSPITAL addn., LINCOLN, NEB. Bryan Hospital Bd. Dirs., 4848 Summer St., Lincoln, Neb., Bids Aug. 2, CD 7/18;
Ray Martin Co., 2241 Y, Lincoln, Neb., LB $672,300, mechanical work Bryan Hospital addn., (Lincoln, Neb.).

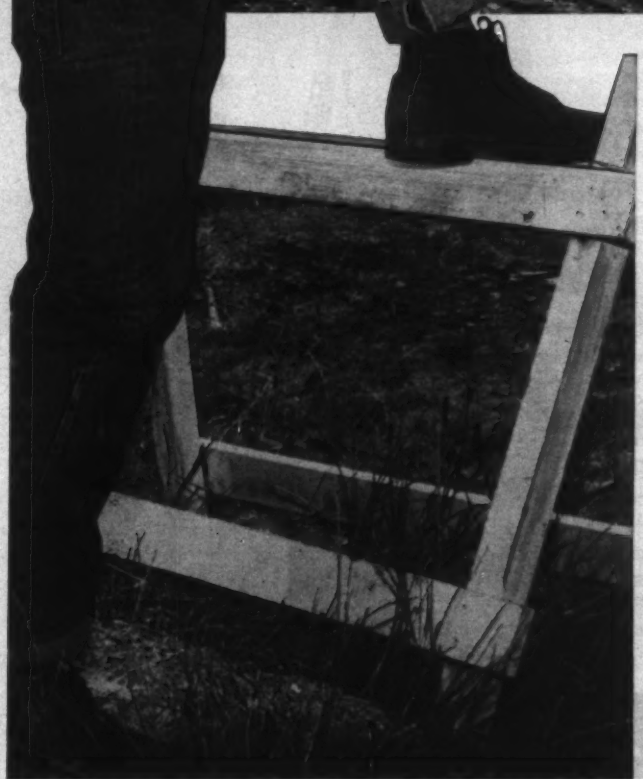
▲ **Winn-Senter Constr. Co.**, 901 W. 43, Kansas City, Mo., LB $899,899 (7 bidders), general contract 6 story, L-shaped, 163 x 232 ft., concrete block and brick WAHL HALL addn., University of Kansas Medical Center, KANSAS CITY, KAN. Dir. Purchases, Dpt. Admin., Rm. 173-N, State Office Bldg., Topeka, Kan. Bids July 26. CD 6/21;
Keener Air, Inc., 917 W. Douglas, Wichita, Kan., LB $472,474 (7 bidders), mechanical work Wahl Hall addn. (Kansas City, Kan.).

▲ **B. Adams**, 4206 Mansfield Highway, Fort Worth, Tex., LB $1,057,000 (10 bidders), general construction Birdville HIGH SCHOOL, BIRDVILLE, TEX. Birdville Ind. School Dist., Birdville, Tex. CD 7/12.

(Continued on page 110)

"I bought another Sherman Digger because...





...since 1953, when I got my first Sherman, I have owned a total of five. The power and maneuverability of the Sherman make it easy to adjust to extreme variances in soil and terrain. The self-equalizer stabilizers also help in this respect. Then, too, the Sherman is faster than competitive makes and service and parts are always available. The jobs I have done range all the way from digging a road up the side of a mountain to digging inside San Quentin prison for an electrical contractor. We like the Sherman because we know what we are getting!"

Harold Withers, Withers & Wight Excavating, San Rafael, Calif.

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SHERMAN

POWER DIGGERS • LOADERS • AUXILIARY TRANSMISSIONS

(Continued from page 108)

▲ **Johnson, Drake & Piper, Inc., and H. A. Lott, Inc.,** 2244 W. Holcombe Blvd., Houston, Tex. (jointly), CA $2,767,000, est. $2,750,000, 11 story, steel and glass type WORLD TRADE CENTER, HOUSTON, TEX: Port Comn. (Navigation Dist.), 1519 Capitol Ave., Houston, Tex. Bids July 14. CD 8/4, under LB.

▲ **Lippert Brothers,** Box 8305, Denver, Colo., LB $1,697,237, est. $1,600,000, four DORMITORIES and DINING HALL 2 and 3 stories, approx. 97,457 sq. ft., Western State College, GUNNISON, COLO. State Planning Div., State Capitol Bldg., Denver, Colo. Bids Aug. 2. CD 7/13.

FAR WEST

HEAVY CONSTRUCTION—BA

Calif., Oceanside—BA 9/14—City, P.O. Box 30, 16- to 18-in. concrete pipe, 2 reservoirs and booster station, etc., Calaveras Water Imprvt. Dist. $650,000. Plans deposit $25.

BUILDINGS—BA

Wash., Tumwater—SCHOOL—BA 9/1—School Dist. 333, Tumwater, 92,000 sq. ft. high school. $850,000. Plans deposit $35. W. A. Johnson & Assocs., 3508 Broadway, Everett, archts. CD 3/16.

▲ **Calif., San Diego** — HOSPITAL — BA 10/11—San Diego County, Rm. 306, Civic Center, Zone 1, 11 story, bsmnt., 370,000 sq. ft. county general hospital. $10,289,000. Plans deposit $8. CD 1/24/59.

HEAVY CONSTRUCTION—LB & CA

Enoch Smith Sons Co., 1441 Beck St., Salt Lake City, Utah, CA $899,517, paving aprons, Salt Lake City Municipal Airport, SALT LAKE CITY, UTAH. Bd. City Comrs., City-County Bldg., Salt Lake City, Utah. Bids July 20. CD 7/28, under LB.

▲ **WASHINGTON**—State Hy. Comn., Transportation Bldg., Olympia,

J. P. Hopkins Co., Box 218, Mercer Island, Wash., CA $2,469,773, draining, erosion control, grading, surf. constr. bit. surf. treatment, b. conc. paving, fencing, two precast prestressed concrete girder bridges, rein.-con. slab bridge, signing, 3.861 mi. Primary State Hy. No. 1, East City Limits of Tacoma to King County Line, FAP Nos. I-5-3(102)135, Unit 2 and I-5-3(96)137, Pierce Co. Bids July 26, awarded July 28. CD 7/29, under LB.

† **Donald M. Drake Co.,** 1600 SW Savier St., Portland, Ore., CA $903,108, Eastside Rd. Modoc Creek, Upper End Section, Middle Fork Willamette River, approx. 10 mi. southeast of Oakridge, Lane Co., CIVENG-35-026-60-208, OREGON. U. S. Eng., Pittock Block, Portland 5, Ore. Bids June 24. CD 6/2.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,

Guy F. Atkinson Co., 10 W. Orange Ave., South San Francisco, Calif., CA $3,993,744, 0.6 mi. U. S. Hy. 101 freeway from Mendocino Ave. Santa Rosa to Grant Creek, incl. 5 interchanges, 4 bridges, Sonoma Co. Bids July 27. CD 7/29, under LB.

† **Southern-Waldrip & Harvick Co.,** 2650 Cherry Ave., Long Beach, Calif., CA $700,000, SAC missile facility, ENG-60-38, Spec. 2627, BEALE AIR FORCE BASE, CALIF. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids June 2. CD 6/8, under LB.

▲ **Ira H. Larsen Co.** 64 South Park, San Francisco, Calif., CA $1,227,711, rebuild concrete exhibit tanks, constr. large exhibition tanks, garage addn., Steinhart Aquarium, Golden Gate Park, SAN FRANCISCO, CALIF. City and San Francisco Co., Dpt. P. Wks., City Hall, San Francisco, Calif. Bids May 4 CD 5/11, under LB.

BUILDINGS—LB & CA

▲ **Kitchell-Phillips Contractors, Inc.,** 4610 W. Camelback, Glendale, Ariz., Owner Builds, $2,500,000, -3 story 68,200 sq. ft. MEDICAL OFFICE Brill Ave., between 9 and 10th Sts., location adjacent to Good Samaritan Hospital, PHOENIX, ARIZ. John Schotanus, Jr., 1401 E. Camelback Rd., Phoenix, Ariz; archt.

Bell & Valdez, 14212 Lake Hills Blvd., Bellevue, Wash. Day Labor, CA $853,450, 68 HOUSES, 165 St. N. E. and N. E. 6 St., BELLEVUE, WASH. CD 12/15/54.

▲ **O. L. Carpenter,** 9095 Imperial Ave., Lemon Grove, Calif., LB $1,989,964, (5 bidders), Sweetwater Springs HIGH SCHOOL, Grossmont, LA MESA, CALIF. Grossmont Union High School Dist., Grossmont High School, La Mesa, Calif. Herluf Brydegaard & Robert Ferris, 1502 6 Ave., Zone 1, archts. Bids Aug. 5. CD 7/25.

▲ **Williams & Burrows, Inc. and O. E. Anderson Co.,** 500 Harbor Blvd., Belmont, Calif., LB $1,879,576, (6 bidders), Proj. II, 8 BUILDINGS, 120,000 sq. ft. total space to incl. Bldgs. B, D, I, L, Football Field and Bleachers, etc., Foothill College, LOS ALTOS, CALIF. Foothill Junior College Dist. of Santa Clara Co., 150 El Camino Real, Mt. View, Calif. Bids June 27. CD 7/6.

▲ **Fred S. Macomber, Inc.,** 4704 E. McKinley Ave., Fresno 2, Calif., CA $1,079,900, STATE OFFICE alterations, 350 McAllister St., SAN FRANCISCO, CALIF. State Div. Architecture, 1120 N St., Sacramento, Calif. Bids July 26, CD 7/29, under LB.

▲ **Hirano Brothers,** 931 University Ave., Honolulu, Hawaii, CA $30,000,000, (5 year program), 1,500 HOMES, Pacific Palisades subdivision, PEARL CITY, HAWAII. Lewers & Cooke, 404 Piikoi St., Honolulu, Hawaii.

CANADA

BUILDINGS—BA

▲ **Que., Verdun**—HIGH SCHOOL, etc.—BA 8/22—Verdun Catholic School Comn., 4480 Blvd. Champlain, high school, two residences, Beurling Ave. $1,500,000. J. Armand Dutrisac, 1069 Beatty Ave. and Jean Maurice Dube, 1001 2nd Ave., archts. Lalonde & Valois, 615 Belmont St., Montreal, engrs. CD 10/22.

HEAVY CONSTRUCTION—LB & CA

▲ **Carter Constr. Co., Ltd.,** 419 Cherry St., Toronto, Ont., CA $4,643,062, buildings and services radar site, MOOSONEE, ONT. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont.

▲ **Standard Paving & Material Ltd.,** 48 St. Clair Ave. W., Toronto, Ont., LB $3,737,777, (8 bidders) 200 x 9,500 ft. runway, parking apron, Malton Airport, TORONTO, ONT. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Aug. 4. CD 7/27.

BUILDINGS—LB & CA

▲ **New Waterford Dist. Consolidated Hospital Comn.,** New Waterford, N. S., rejected bids July 8, HOSPITAL and NURSES' HOME, Maple Hill, NEW WATERFORD, N. S. Est. $1,100,000. Gregory Lambros & Keith L. Graham, 53 Spring Garden Rd., Halifax, N. S., archts. Brett Ouellette, Blauer Assocs., 1010 St. Catherine St. W., Montreal, Que., engrs. CD 7/20.

▲ **Pigott Constr. Co., Ltd.,** 36 James St. S., Hamilton, Ont., CA $1,600,000, 200,000 sq. ft. steel INDUSTRIAL PLANT expansion, northeast corner Burlington and Wilcox Sts., HAMILTON, ONT. International Harvester Co. of Canada Ltd., 208 Hillyard St., Hamilton, Ont. Kyles & Kyles, 247 John St. S., Hamilton, Ont., archts. Bids July 26, awarded July 29. CD 7/20.

▲ **Newman Bros. Ltd.,** Box 608, St. Catharines, Ont., CA Est. $1,000,000, HOSPITAL addn., ST. CATHARINES, ONT. Hotel Dieu Hospital, 155 Ontario St., St. Catharines, Ont. Bids May 11, awarded Aug. 2. CD 5/6.

▲ **Anglin-Norcross (Ontario) Ltd.,** 224 Davenport Rd., Toronto, Ont., CA Est. $4,000,000, 10 story, 155,000 sq. ft. air-conditioned OFFICE, southeast corner University Ave. and Adelaide St., TORONTO, ONT. Dominion of Canada General Insurance Co., 26 Adelaide St. W., Toronto, Ont. Bids July 19. CD 7/5.

▲ **Charles Duranceau Ltee,** 2545 Jacques Hertel St., Montreal, Que., CA Est. $1,300,000, (6 bidders), LA SALLE HOSPITAL, Champlain Blvd. and Latour Rd., MONTREAL, QUE. LaSalle General Hospital, 7667 LaSalle Blvd., Montreal, Que. Bids June 1. CD 5/31.

(Continued on page 112)

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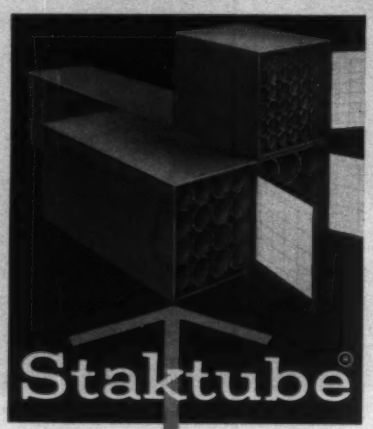

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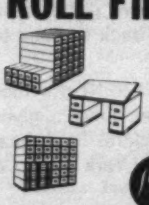

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(Continued from page 110)

PROPOSED PROJECTS

WATER SUPPLY

▲ **Mo. St. Louis**—City, Bd. P. Service, 304 City Hall, Zone 3, plans by R. W. Booker & Assocs., 215 N. 11 St., Zone 1, coagulant plant at Chain of Rocks WW pumping station on Mississippi River, northern edge of City. $1,200,000. CD 4/25/57.

▲ **R. I., Portsmouth**—City, City Hall, 35 mi. water supply distr. system, storage, pumping station $1,565,400. To go ahead 1961. CD 1/9/46.

▲† **Texas**—Soil Conservation Service, Dpt. Agriculture, Temple, watershed and flood control project East Keechi Creek, near Perrin, for Palo Pinto, Upper West Fork, Hood-Parker Soil Conservation Dist., and East Keechi Creek Water Control & Imprvt. Dist, Palo Pinto, Jack and Parker Counties, $1,336,661.

SEWERS, WASTE DISPOSAL

▲ **Ala., Mobile**—City, City Hall, sanitary sewer trunk lines City Park area. $1,200,000. J. B. Converse & Co., Inc., 508 Dauphin St., consult. engrs.

▲ **Fla., Orlando**—City, City Hall, bond election Nov. 8, sanitary and storm sewers, $4,500,000.

▲ **Ill., Glenview**—Village, Village Hall, storm sewers, $1,500,000. CD 1/8/58.

▲ **N. H., Lincoln**—Town, Town Hall, collection and intercepting sewers, pumping stations, force main, sewage plant, $1,000,000. To go ahead 1963.

▲ **N. Y., Chittenango**—Village, Village Hall, sewerage and treatment plant, $1,339,577. To go ahead 1961-62.

▲ **O., Columbus**—City, City Hall, bond election Nov. 8, sewers, $5,580,000. CD 5/11.

▲ **Ore., Springfield**—City, City Hall, sanitary sewerage system, $2,070,000. Construction 1961.

STREETS AND ROADS

▲ **Fla., Orlando**—City, City Hall, bond election Nov. 8, street imprvs., $3,570,000. CD 6/10/54.

▲ **RHODE ISLAND**—State P. Wks. Dpt., State House, Providence.
Providence Co.—rebuilding, relocating 2.7 mi. Greenwich Ave., Warwick and Cranston, $1,460,000.

▲ **Tex., Canton**—Van Zandt County, Courthouse, road construction, imprvs., $1,000,000.

AIRPORTS

▲† **Calif., March Air Force Base**—OPERATIONAL—U. S. Eng., 751 S. Figueroa St., Los Angeles, operational and maintenance facilities, Riverdale, $7,428,000.

▲† **Calif., Lompoc**—MAINTENANCE FACILITIES, etc.—U. S. Eng., 751 Figueroa St., Los Angeles, maintenance and utilities, Vandenberg Air Force Base, $1,284,000. CD 4/27.

▲† **Ky., Fort Campbell**—HOUSING—U. S. Eng., P.O. Box 1070, Nashville 2, Tenn., 500 units, Capehart housing, $5,000,000.

▲† **La., Shreveport**—OPERATIONAL FACILITIES—U. S. Eng., P.O. Box 867, Little Rock, Ark., operational facilities, Barksdale Air Force Base, $7,265,000.

▲† **Me., Bangor**—TRAINING, MAINTENANCE, etc.—U. S. Eng., 150 Causeway St., Boston, Mass., operational and training, maintenance, supply, and hospital facilities, Dow Air Force Base, $2,575,000.

▲† **Mich., Oscoda**—OPERATIONAL AND TRAINING FACILITIES—U. S. Eng., 1101 Washington Blvd., Detroit, Zone 26, operational and training facilities, maintenance and supply facilities, Wurtsmith Air Force Base, $2,400,000. CD 1/14.

▲† **Miss., Columbus**—OPERATIONAL FACILITIES, etc.—U. S. Eng., 2301 Grant St., Mobile 7, Ala., operational and training, supply, maintenance facilities, troop housing and community facilities, Columbus Air Force Base. $2,921,000. CD 9/9/58.

▲† **Miss., Biloxi**—TRAINING FACILITIES—U. S. Eng., 2301 Grant St., Mobile 7, Ala., operational and training facilities, Keesler Air Force Base, $2,499,000.

▲† **Nev., Las Vegas**—MAINTENANCE FACILITIES, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., maintenance, troop housing and community facilities, Nellis Air Force Base, $2,223,000. CD 9/28.

▲† **N. C., Cherry Point**—OPERATIONAL FACILITIES—Dist. P. Wks. Office, 5th Naval Dist., Rm. 307, Bldg. NO26, Naval Base, Norfolk, Va., operational facilities, utilities, Marine Corps Air Station, $1,611,000.

▲ **N. D. Grand Forks**—HOSPITAL—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., plans by Ellerbe & Co., 333 Sibley St., St. Paul, Minn; hospital, Grand Forks Air Force Base. $1,500,000. CD 9/25.

▲ **Okla., Oklahoma City**—WAREHOUSES, etc.—Oklahoma City Airport Trust, First National Bldg., plans by Hudgins, Thompson & Ball, 1411 Classen Dr., warehouses, paved storage warehouse, underground storage vault, paved parking areas et Federal Aviation Center. $6,500,000 CD 12/26/57.

▲† **Tenn., Tullahoma**—ENGINE TEST—U. S. Air Force, Tullahoma, vertical rocket engine test cell to test engines of larger missiles, $10,500,000. Sverdrup & Parcel, Inc., 915 Olive, St. Louis, Mo., consult. engr. CD 7/29.

▲† **Tex., Austin**—APPROACH LIGHTING—U. S. Eng., Box 1229, Galveston, 2¼ mi. approach lighting; hound

(Continued on page 116)

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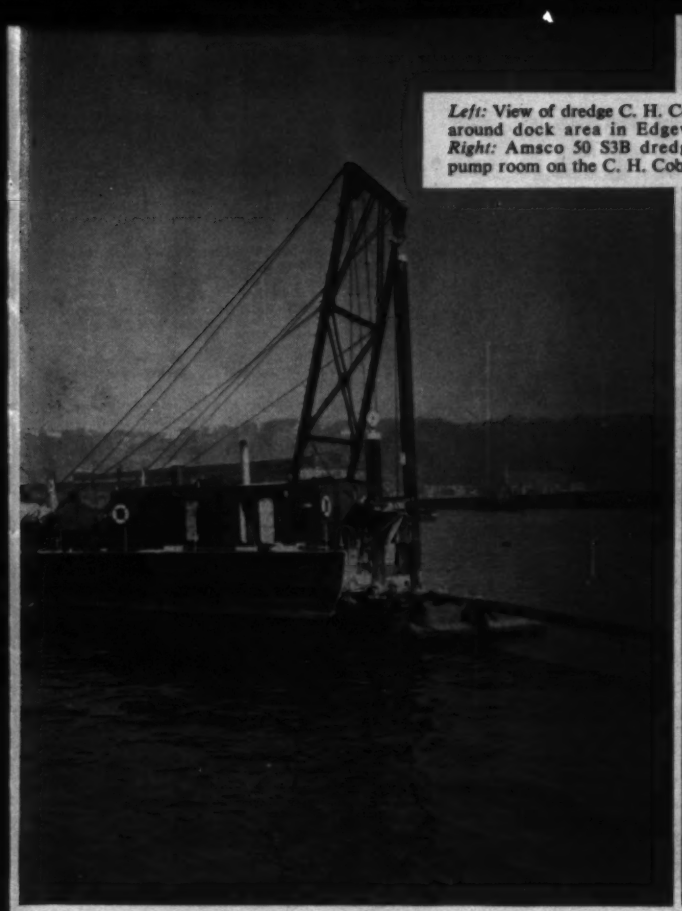
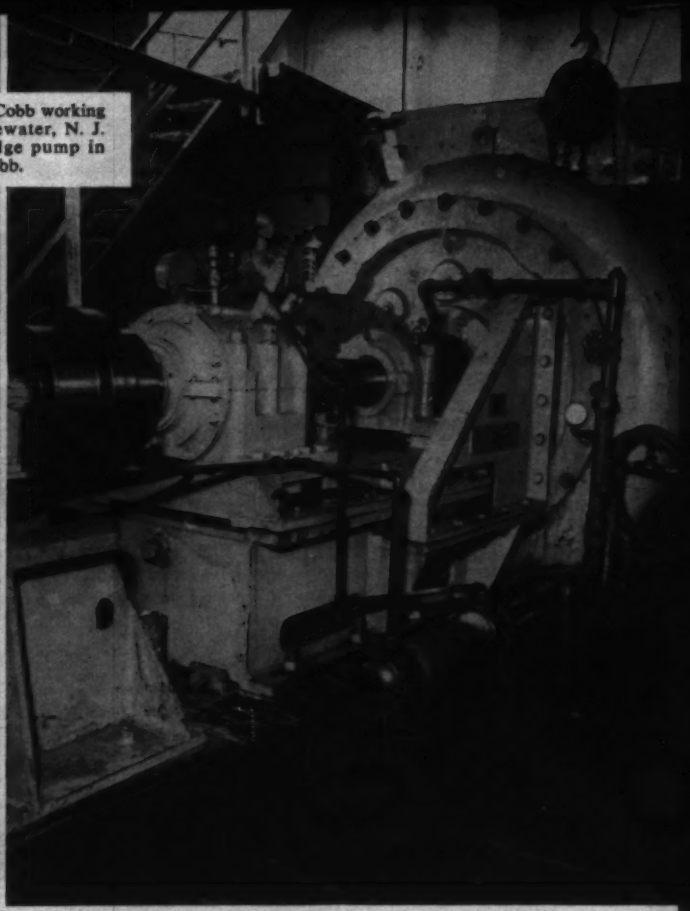
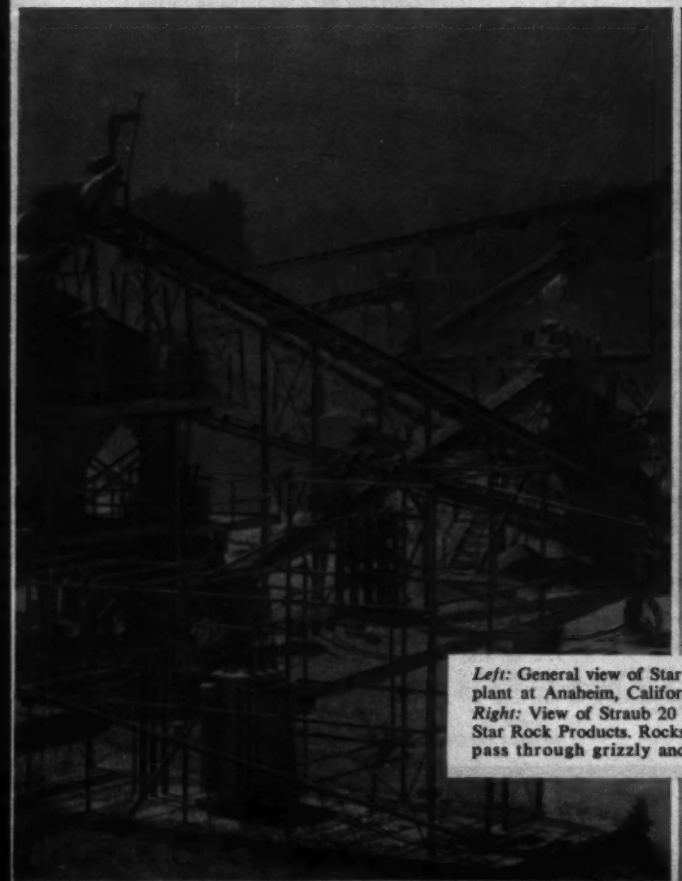
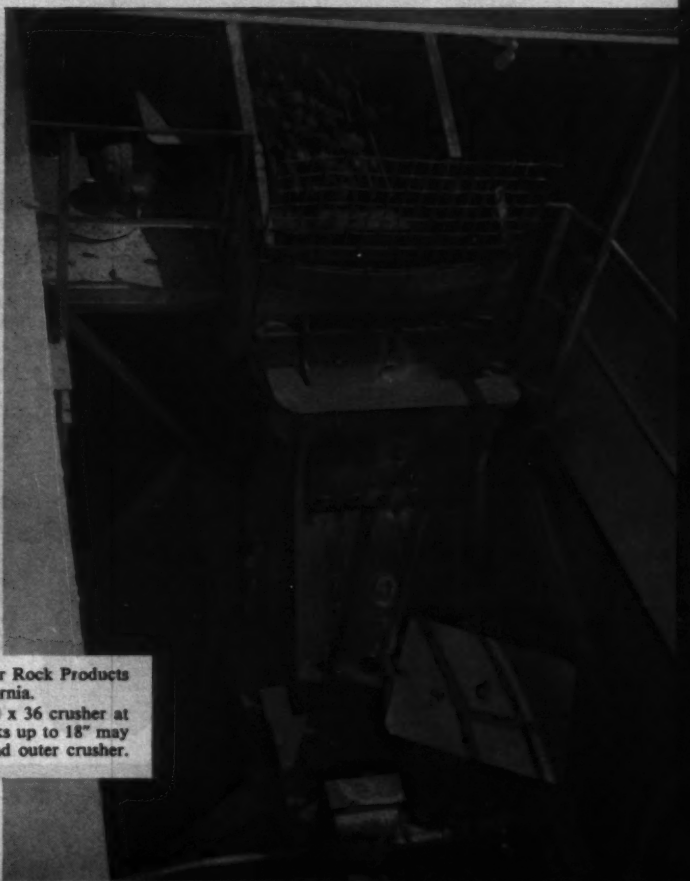




Left: View of dredge C. H. Cobb working around dock area in Edgewater, N. J.
Right: Amsco 50 S3B dredge pump in pump room on the C. H. Cobb.





Left: General view of Star Rock Products plant at Anaheim, California.
Right: View of Straub 20 x 36 crusher at Star Rock Products. Rocks up to 18" may pass through grizzly and outer crusher.

(Continued from page 112)

dog missile storage, building rehabilitation, etc., Bergstrom Air Force Base. $1,000,000. CD 9/11/58.

▲† Wash., Moses Lake—OPERATIONAL FACILITIES, etc.—U. S. Eng., City-County Airport, Walla Walla, operational facilities, maintenance facilities, troop housing, utilities, Larson Air Force Base. $1,282,000. CD 9/9/58.

UNCLASSIFIED

▲† Calif., Sonoma—OPERATIONAL FACILITIES—Dist. P. Wks. Office, 12th Naval Dist., Room C112, San Bruno, operational facilities, Naval Radio Station, Skaggs Island, $1,579,000.

▲ Ky., DeCoursey (P.O. Covington)—FREIGHT CLASSIFICATION YARDS—Louisville & Nashville R.R., 9 and Broadway, Louisville, enlarge and improv. freight classification yards. $11,500,000. (Over three-year program).

▲ Md., Oroville—POWER PLANT—Southern Maryland Electric Cooperative, Hughesville, steam power plant, near here, $18,000,000.

▲† North Carolina — PARK IMPRVS. — National Park Service, Dpt. Interior, 19 and C Sts. N.W., Wash. 25, D. C., 2U-1, grading, base, tunnel, lining and portals, Flat Laurel Gap, Wagon Rd. Gap, $1,011,400; 2S-2, Chestnut Cove-Beaver Dam Gap, $1,920,000; 2S, 3 and 4 structures, $318,800; 2P, Tanbark Ridge Tunnel portal, $62,500; 2X, 50 surface treatment Balsam Gap, Soco Gap, $80,000; minor roads and trails, Crabtree Meadows, Julian Price Campground, General, $120,700, Blue Ridge Parkway. CD 5/14/56.

▲† North Carolina — PARK IMPRVS. — National Park Service, Dpt. Interior, 19 and C Sts. N.W., Wash. 25, D. C., Bryson-Goldmine Branch Rd. (Por.) $404,000; Newfound Gap Highway, Rte. 1B (Compl.) $1,500,000; Drives, Deep Creek Residential Area, $5,600; bridge over Oconaluftee River, $75,000; building and utilities Deep Creek Residential Area, (N. C.) $60,500; Appalachian Trail, Cosby Campground, Campfire Circle, M-159, Metcalf Bottoms Picnic Area, Tenn., $102,600, Great Smoky Mountains National Park.

▲ O., Cleveland—ZOO—Comrs. Cuyahoga County, County Administration Bldg., 1219 Ontario St., Zone 13, vote on a 1-mill 4-year levy Nov. 8, Cleveland Zoo Imprvs. $2,500,000. CD 2/25, under City as owner.

▲ O., Columbus—RECREATION—City, City Hall bond election Nov. 8, recreation $4,268,000. CD 9/12/58.

▲† Tennessee—PARK IMPRVS.—National Park Service, Dpt. Interior, 19 and C Sts. N.W., Wash. 25, D. C., paving Route 15, Gatlinburg Spur, Gatlinburg-Caney Creek $153,000; Section 8G, grading, etc., Little River Murray Gap (Compl.) $750,000; grading and stone base course, structures and paving, Gatlinburg By-Pass (Compl.) $1,919,000; access road, Look Rock, R-21, $113,300, Foothills Parkway; Foothills Parkway buildings and utilities, Look Rock Development, $139,900.

▲† Virginia—PARK BRIDGES—National Park Service, Dpt. Interior, 19 and C Sts. N.W., Wash. 25, D. C., bridges over Turkey and Dead Runs, George Washington Memorial Parkway, $1,437,500.

▲ Wyoming and Utah—PIPE LINE—Colorado Interstate Gas Co., Colorado Springs National Bank Bldg., Colorado Springs, Colo., and 2961 Chambers Rd., Denver, Colo., 155 mi. 34 in. pipe line from line at Rock Springs, Wyo. to Provo, Utah, $92,829,566. CD 1/27/59, under Colorado and Utah.

▲† Wyoming — BUILDINGS and UTILITIES — National Park Service, Dpt. Interior, 19 and C Sts. N.W., Wash. 25, D. C., buildings and utilities Mammoth, Madison Junction Old Faithful, Lewis Lake campground, Bridge Bay, Grant Village and Park General, Yellowstone National Park, $1,421,600; Norris to Canyon, 8.4 mi. and 2 bridges, Grand Loop, 9.1 mi., Chittenden Bridge reconstruction, minor roads and trails, Mammoth, Lewis Lake campground, Grant Village, Park General, Yellowstone National Park, $2,359,700. CD 9/21/59.

PUBLIC BUILDINGS

▲ Ala., Auburn—SCIENCE—Auburn University plans by Sherlock, Smith & Adams, 303 Washington Ave., Montgomery, and Pearson, Tittle & Narrows, First National Bank Bldg., Montgomery, science bldg. $3,250,000. CD 9/14.

▲ Ala., Montgomery—SCHOOL—State Bd. Educ., State Office Bldg., plans by Johnson & Williams, 335 Dexter Ave., trade school, $1,000,000. CD 9/10.

▲ Ala., Ozark—HOUSING—Ozark Housing Auth. plans by Evan M. Terry, 2129 Montgomery Hy., Birmingham, 100 housing units, $1,000,000. Walter Schoel, 207 Title Guarantee Bldg., Birmingham, consult. engr.

▲ Calif., Covina—HIGH SCHOOL—Covina Valley Unified School Dist., 165 E. Dexter, plans by H. L. Gogerty, 3123 W. 8th St., Los Angeles, high school, South Hills Area. $2,500,000. CD 11/12/58.

▲ Calif., Los Banos—SCHOOL—Los Banos Union High School Dist., c/o Supt., Box 472, bond election Sept. 20, 60,000 sq. ft. high school, 23,000 sq. ft. Junior High School, $1,700,000. CD 6/10/59.

▲ Calif., Marysville—COURTHOUSE—County of Yuba, c/o Clerk, Courthouse, plans by Harold M. Hansen, 231 Post St., San Francisco, 120,000 sq. ft. reinforced concrete, steel courthouse, $2,500,000. CD 10/29/57.

▲ Calif., Santa Maria—SCHOOL—Santa Maria Joint Union High School Dist., plans by H. L. Gogerty, 3123 W. 8th St., Los Angeles, and D. Stewart Karr, 633 E. Main St., frame, stucco high school, Increment 1, $2,750,000. CD 2/20/51.

▲ Colo., Fort Collins—SCHOOL—Colo. State University State Planning Comn., State Capitol Bldg., Denver, plans by James M. Hunter & Assocs., 1126 Spruce St., Boulder, classroom and office, $1,000,000; Humanities Building, $700,000, for Colorado State University.

▲ Conn., Greenwich—SCHOOL—Town of Greenwich, Bd. Educ., Havemeyer Bldg., plans by Perkins & Will, 55 Church St., White Plains, N. Y., and Howard Juster, 6 E. 23 St., New York, N. Y., assoc. archt., Dundee Elementary School, Florence Rd. $1,000,000. Segner & Dalton, 55 Church St., White Plains, N. Y., consult. engrs. Bids in November. CD 6/8.

▲ Fla., Orlando—THEATER-CONVENTION HALL—City, City Hall, bond election Nov. 8, theater-convention hall, $1,600,000.

▲† Idaho, Arco—TECHNICAL CENTER—Atomic Energy Comm., Idaho Operations Office, Idaho Falls, plans by Koebig & Koebig, 3242 West 8th, Los Angeles, Calif., technical center, at National Reactor Testing Station, $1,000,000.

▲† Md., Aberdeen Proving Ground—TRAINING FACILITIES, etc.—U. S. Eng., 24 St. and Maryland Ave., Baltimore, training and medical facilities, utilities, $6,221,000.

▲† Md., Annapolis—HOUSING—P. Wks. Office, Chesapeake, U. S. Naval Weapons Plant, Wash. 25, D. C., troop housing, Naval Academy. $6,000,000. CD 9/8/58.

▲ Md., Towson—SCHOOL—Baltimore Co. Bd. Educ., Aigburth Rd., Zone 4, plans by Hopkins & Pfeiffer, 10 E. Mulberry St., Baltimore, Zone 2, 1 story, concrete, brick, steel Woodlawn Junior High School, Woodlawn. $1,500,000.

▲ Mass., Boston—HOUSING—City Boston, Housing Auth., 230 Congress St., plans by Whitney Atwood & Norcross Assoc., 256 Boylston St., housing for the elderly, Franklin, Field, Dorchester. $1,600,000. Constr. 1961.

▲† Mass., Fort Devens—HOUSING, UTILITIES—U. S. Eng., 424 Trapelo Rd., Waltham, Zone 54, troop housing, utilities, $2,157,000.

▲ Mich., Livonia—SCHOOL, etc.—Livonia School Dist., 3301 5 Mile Rd., high school, gymnasium, swimming pool, Joy Rd. between Hillcrest and Perrin Sts. $4,400,000. CD 3/25/58.

▲† Mo., Kansas City—FEDERAL OFFICE—General Services Admin., 2306 E. Bannister Rd., Kansas City, Mo., plans by Voskamp & Slezak, 18 E. 11, Kansas City, Mo., Everitt & Keleti, 4550 Main, Kansas City, Mo., Radotinsky Meyn & Deardorff, 1401 Fairfax

(Continued on page 120)

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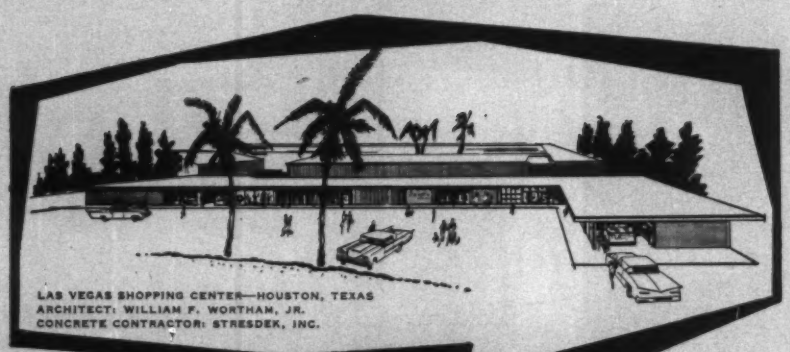

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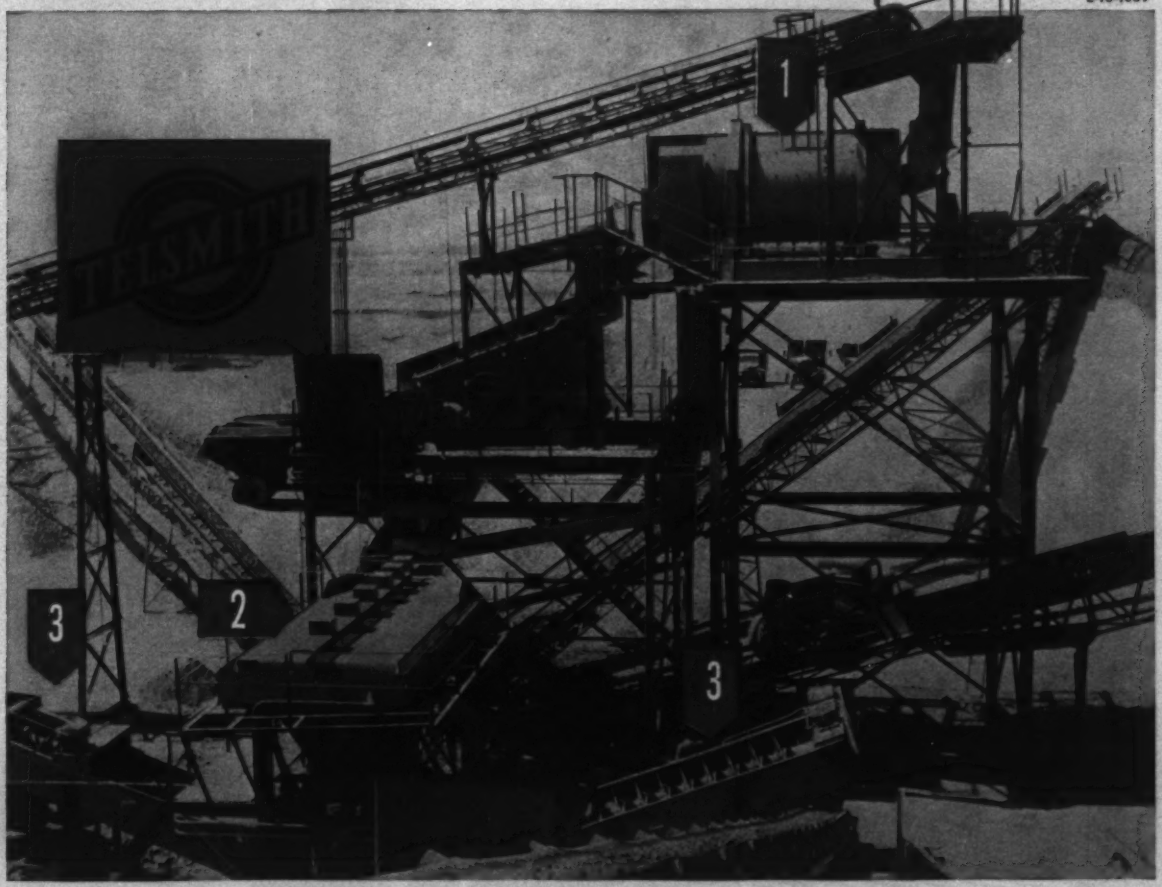

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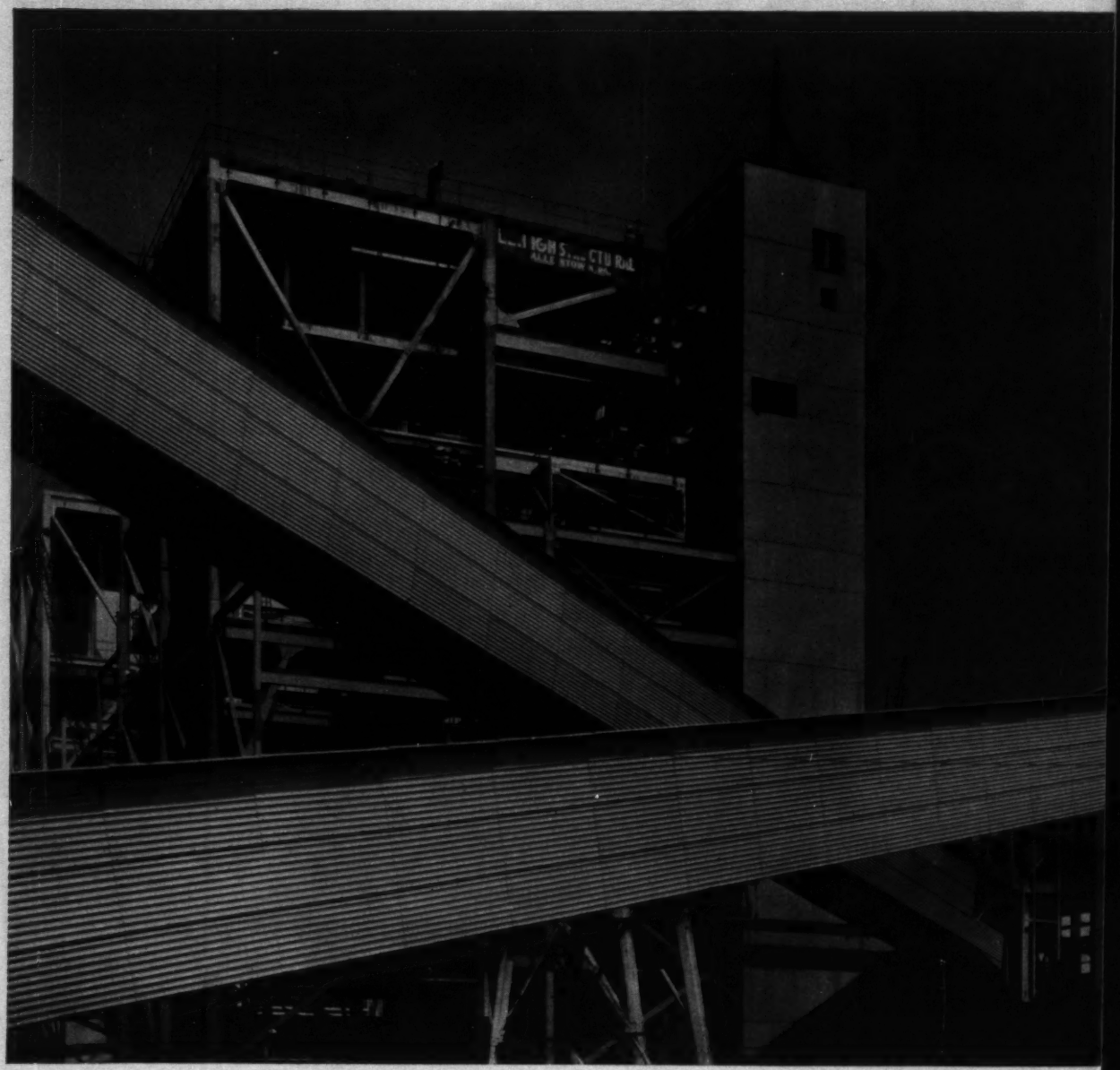

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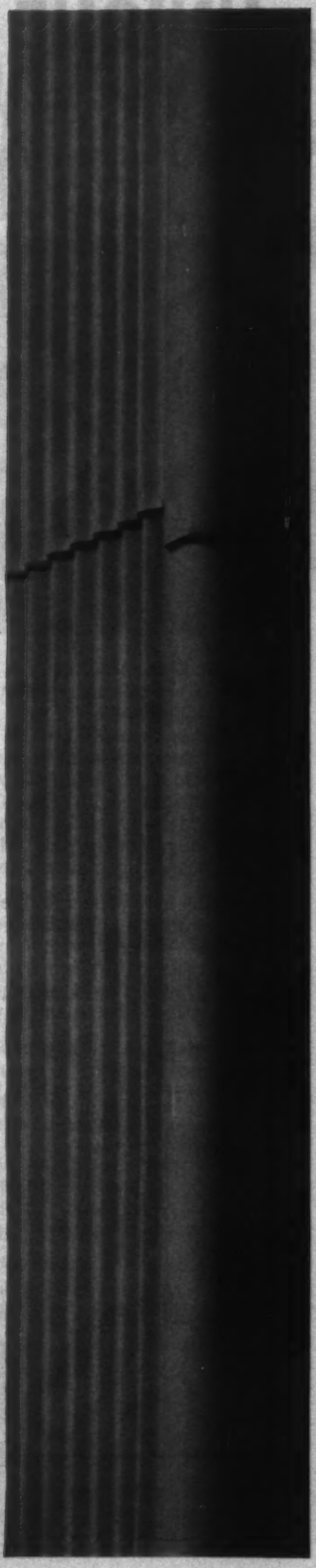

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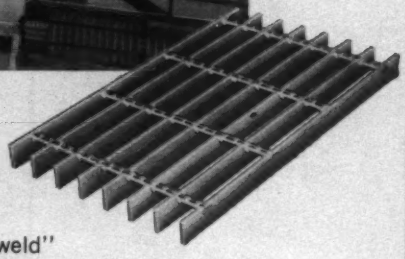

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(Continued from page 116)

Trafficway, Kansas City, Kan., federal office. $35,000,000. Howard-Needles-Tammen & Bergendoff, 1805 Grand, Kansas City, Mo., consult. engrs. CD 2/4.

▲† **N. J., Fort Monmouth**—RESEARCH, DEVELOPMENT FACILITIES, etc.—U. S. Eng., 111 E. 16 St., New York 3, N. Y., research, development, test facilities, troop housing, community facilities. $8,803,000. CD 7/25/58.

▲ **N. C., Durham**—CAFETERIA, etc.—North Carolina Dpt. Educ., State Bldg., Raleigh, cafeteria, $500,000; student center, $625,000; women's dormitory, $1,087,000; mens dormitory, $816,500, all at North Carolina College.

▲ **N. C., Winston-Salem**—SCHOOL—Forsythe Co. Bd. Educ., Reynolds Rd., Consolidated High School, $1,200,000. CD 4/20/54.

▲ **O., Beloit**—SCHOOL—Bd. Educ., West Branch School Dist., bond election Nov. 8, High School. $1,150,000.

▲ **O., Cleveland**—SCHOOLS—Bd. Educ., 1380 E. 6th St., Zone 14, 2 mill, 4-year levy election, Nov. 8, schools, $22,000,000. Earl Shobe, c/o owner, archt. CD 5/9.

▲ **O., Columbus**—SCHOOL—Columbus Bd. Educ., 270 E. State St., high school, Maize Rd., $1,700,000; Whetstone Senior High School, $1,500,000. CD 11/11.

▲ **Tenn., McMinnville** — HOSPITAL — Warren County, Courthouse, McMinnville, hospital. $1,000,000.

▲ **Tex., Dallas**—SCHOOL—Dallas Ind. School Dist., 3700 Ross Ave., plans by Goodwin & Cavitt, Vaughn Bld., and Mark Lemmon, 201 Thomas Bld., Senior High School, Old Seagoville Rd. and Masters Dr. $3,400,000. R. L. Rolfe, 2401-A Bryan St., consult. engr. CD 5/13.

▲ **Tex., Galena Park**—SCHOOL—Galena Park Ind. School Dist. plans by Lightfoot-Burleson & Associates, 3100 Audley St., Houston, consult. engrs.-archts., masonry, Senior High School, Northshore area, $2,250,000. CD 10/27.

▲ **Wash., Tacoma**—SCHOOL—Clover Park School Dist. No. 400, 5214 Steilacoom Blvd., $1,300,000 bond election Sept. 13, high school, $2,750,000. D. F. Burr & Assocs., Lakewood Center, archts. CD 6/22.

▲ **W. Va., Morgantown**—UNIVERSITY CENTER, etc.—West Virginia University, university center, $5,000,000; 3 college bldgs., $4,400,000; fieldhouse-auditorium, $6,000,000; housing, $6,500,000; main library addn., $1,500,000; Demonstration Elementary School, $660,000; Communications Bldg. addn., $460,000.

▲ **Wis., Brookfield**—SCHOOL—Brookfield Union High School Dist. No. 1, 16400 Gebhard Rd., voted bonds July 25, Senior High School, $2,500,000. Grassold & Johnson & Assocs., 734 N. Jefferson St., Milwaukee, Zone 2, archts. CD 11/19.

▲ **Wis., Janesville**—NURSING HOME—Rock Co., Courthouse, plans by C. L. Ames & Assocs., 3709 W. Fond du Lac Ave., Milwaukee, nursing home, $2,000,000. CD 10/21.

▲ **Wis., Juneau**—COUNTY HOME, etc.—Dodge County, Courthouse, plans by Foeller, Schober, Berners, Safford & John, 310 Pine St., Green Bay, 2 and 3 story County Home and Infirmary addn. $1,075,000.

▲ **Sask., Regina**—LIBRARY—City, City Hall, plans by Izumi, Arnott & Sugiyama, 2151 Albert, 2 story, basmt. 140x205 ft., rein.-con. library, $1,000,000. CD 2/26.

COMMERCIAL BUILDINGS

▲ **Ala., Mobile**—HOSPITAL—Bd. Trustees, Mobile Infirmary, Mobile, plans by Platt Roberts & Co., Merch. Nat'l Bk., 200-bed, 6-story, 120,000 sq. ft. hospital addn. $2,500,000. CD 5/14/59.

▲ **Ala., Montgomery**—OFFICE—Alabama Power Co., 600 N. 18th St., Birmingham, plans by Pearson, Tittle & Narrows, First National Bank Bldg., office, $1,500,000. Morton & McElhaney, 239 Dexter Ave., consult. engr. CD 10/22.

▲† **Calif., Point Mugu**—HOUSING—11th Naval Dist., 1220 Pacific Hy., San Diego, Zone 1, 300-unit Capehart housing, Pacific Missile Range. $3,000,000. CD 7/25.

▲ **Conn., Mount Carmel**—HOUSING—B & C Contr. Co., Inc., 299 George St., New Haven, 60 houses, YORK HILL, Sherman Ave. $1,050,000.

▲ **Conn., Niantic**—HOUSING—Lifetime Homes, Inc., 523 Boston Post Rd. Old Saybrook, 125 Houses, Roxbury Rd. $2,000,000.

▲ **Fla., Kendall**—HOSPITAL—Owner, c/o Gilbert Fein, archt., 1550 S. Dixie Hy., Coral Gables, hospital, $5,000,000.

▲ **Fla., Leesburg**—SHOPPING CENTER—Walling-Crate Co., Inc., N. 14th St. and Seaboard Airline Railroad, plans by Jack R. Jones, 725 S. 14th St., shopping center, $1,000,000; Wolpert, Tilden, Denson & Associates, 318 E. Princeton Ave., Orlando, consult. engrs. CD 6/13.

▲ **Hawaii, Kamaole, Kihei**—HOTEL—Canadian Developers, Chris Engel and Steve Predy, 835 Keeaumoku St., Honolulu, 2 story, 138 room Maui Tropics Hotel. $1,500,000.

▲ **Idaho, Idaho Falls**—HOSPITAL ADDNS.—Latter Day Saints Hospital, plans by Jackson, Sharp & Collard, 457 S. 3rd St. E., Salt Lake City, Utah, hospital addns. $1,237,000. Constr. this year. CD 11/9.

▲ **Ill., Chicago**—APARTMENT—Jerrold Wexler, 120 S. LaSalle St., Zone 3, 31 story, 900 unit apartment, Randolph St. and Lake Michigan St. $25,000,000.

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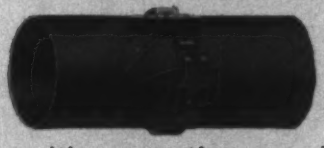

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▲ **Ind., Fort Wayne**—SHOPPING CENTER—Owner, c/o Norbert Knapke, Lincoln Bank Tower, Casselwood Shopping Center, 1,800 car parking, SE corner Paulding and Hesson Cassel Rds., 35 acre site, $2,000,000.

▲ **Kan., Leavenworth**—HOSPITAL—St. John's Hospital, Leavenworth, plans by Hewitt & Royer, 607 Westport Rd., Kansas City, Mo., 100-bed hospital addn. Over $1,000,000.

▲ **Ky., Owensboro**—OFFICE—Texas Gas & Transmission Co., 3 and Locust St., Zone 11, plans by Skidmore Owings & Merrill, 425 Park Ave., New York, N. Y., 150,000 sq. ft. office building, $3,500,000. Bids in September. CD 7/29.

▲ **Mass., Dorchester**—SPORT CENTER—Owner, c/o Stephen Hopkins, 8 Beacon St., Boston, sport center, stadium with retractable roof, convention hall, motel, football, baseball playing field, parking, $25,000,000. Metcalf & Eddy-Statler Bldg., Boston, consult. engrs.

▲ **Mass., Peabody**—HOSPITAL—Josiah B. Thomas Hospital, 17 King St., plans by Howe & Prout, 17 Custom House St., Providence, R. I., hospital expansion, rehabilitation, 17 King St. $1,000,000. Constr. 1961. CD 8/23/57.

▲ **Nev., Reno**—AUDITORIUM—Washoe County Fair Rd., Reno, plans by Richard Neutra, 2300 Silver Lake St., civic auditorium. $3,000,000.

▲ **N. H., Manchester**—SHOPPING CENTER—All State Realty Co. of New Hampshire, 150 Causeway St., Boston, Mass., plans by Harvey & Provost, 150 Causeway St., Boston, Mass., shopping center, Elm St. $1,500,000. Constr. 1960.

▲ **N. J., Freehold**—APARTMENT, etc.—Olympia, Inc., c/o Warfield Hobbs, 1st National City Bank, 52 Wall St., New York, N. Y., 14 story apartment, theatre, library and geriatric research center for elderly, off Rte. 33, Manalapan Twp. $15,000,000-$18,000,000.

▲ **N. J., Freehold**—GOLF CLUB—Richland Agency, Inc., 20 Exchange Pl., New York, N. Y., golf club, Rte. 527, Manalapan Twp. $2,000,000.

▲ **N. J., Matawan**—SCHOOL—Bd Educ., Matawan Boro, Broad St., plans by Finne Lyman & Finne, 1155 Magnolia Ave., Elizabeth, High School. $2,500,000. CD 12/11.

▲ **N. Y., New Castle**—OFFICE—International Business Machines Corp., 590 Madison Ave., New York, Zone 22, plans by Skidmore, Owings, Merrill, 425 Park Ave., New York 22, N. Y., 250,000 sq. ft. office, Wenga Farm for General Products and Data Systems, IBM Divs. $5,000,000. Alexander Potter Assocs., 50 Church St., New York 7, N. Y., consult. engrs. Slocum & Fuller, 207 E. 32 St., New York 16, N. Y., mechanical engrs. Severud Elstad Krueger, 415 Lexington Ave., New York 17, N. Y., structural engr.

▲ **N. Y., New York**—OFFICE—American Broadcasting-Paramount Theatres, Inc., 7 W. 66 St., Zone 23, 30 story office, west of Columbus Ave. between W. 66 and W. 67 Sts. Over $5,000,000. The Austin Co., 600 5 Ave., Zone 20, engr. Constr. 1965.

▲ **N. Y., New York**—APARTMENT—Eastwood House, Inc., 50 E. 42 St., Zone 17, plans by Greenberg & Ames, 303 Park Ave. S., Zone 10, 16 story apartment, 1345 1st Ave. $1,000,000.

▲ **N. Y., New York**—APARTMENT—Herby Realty Corp., 401 Broadway, plans by Henry George Greene, 855 6th Ave., Zone 1, 20 story apartment, 1245 Park Ave. $2,600,000.

▲ **N. Y., New York**—APARTMENT—1500 Second Ave. Corp., 205 E 85 St., plans by Schuman & Lichtenstein, 360 Lexington Ave., Zone 17, 13 story apartment, 301-303 E. 78th St., and 1498-1504 Second Ave., $1,125,000.

▲ **N. Y., New York**—APARTMENTS—3rd Ave. and 60 St. Assocs., c/o Nassoit & Sulzberger & Co., Inc., 175 W. 72 St., Zone 23, plans by Horace Ginsbern, 205 E. 42 St., Zone 17, N. Y., 20 story and 8 story APARTMENTS, E. 60 St., E. 61 St. and West side 3 Ave. $2,200,000. Allan Rogers, 45 5 Ave., Zone 3, mechanical engr. Greenhut & Taffel, 114 E. 32 St., Zone 16, structural engrs.

▲ **N. C., Durham**—STORE—Wright Real Estate Co., 206 W. Mangum Ave., plans by Copeland, Novak & Israel, 744 Lexington Ave., New York, N. Y., 5 story, 65,000 sq. ft. department store. $1,000,000. Hackney & Knott 321 E. Chapel Hill St., assoc. archts. Thalhimer's-Ellis-Stone Dept. Store, Main St., lessee.

▲ **O., Cincinnati**—OFFICE, etc.—Carrousel Motel Inc., 8001 Reading St., plans by Pansiera & Dohme, 3157 Woodford St., 5 story office and motel addn., Reading Rd. $4,000,000.

▲ **O., Cincinnati**—APARTMENT—Marvin L. Warner Co., 320 W. Benson St., plans by A. M. Kinney, Inc., archt-engr., 2912 Vernon Pl., 84 unit apartment, Celestial St., Mount Adams Section, $3,000,000. Constr. Apr. 1961.

▲ **O., Harrison**—SHOPPING CENTER—Wood Realty Co., Carew Tower, Cincinnati, plans by Betz & Bankemper, Scott St., Covington, Ky. 100,000 sq. ft. shopping center, south of US 52. $1,500,000.

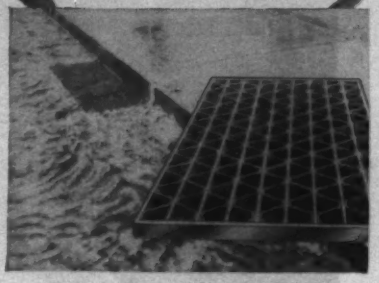
▲ **Ore., Oceanlake**—APARTMENT, etc.—Oregon Senior Citizens of Oceanlake Inc., Oceanlake, plans by Leslie Poole, Royal Bldg., Portland, 10 story retirement apartment and 60 single story buildings, $3,000,000.

▲ **Tenn., Bristol**—CHURCH, etc.—First Presbyterian Church, Bristol, plans by Raymond H. Julian, National Bank Blvd., Charlottesville, Va., church sanctuary, educational bldg., chapel, $1,100,000.

▲ **Tenn., Nashville**—HOSPITAL, etc.—McHarry Medical College, 1005 18th Ave. N., plans by Paul R. Williams, 3575 Wilshire Blvd., Los Angeles, Calif., hospital addn., $1,000,000 medical education center, $4,000,000; apartment, shopping center, $4,000,000. CD 4/8/6.

(Continued on page 128)

FLOODED HIGHWAYS HINDER TRAFFIC



OLD heavy cast iron draingrates, averaging at best 40% clear opening, often fail to carry off rain water fast enough during heavy downpours, resulting in flooded highways—particularly at underpasses. Also, cracked draingrates must be replaced.

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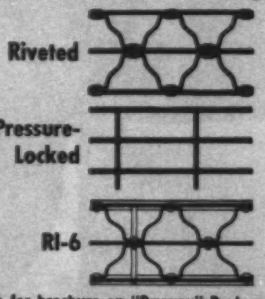

Write for brochure on "Dryway" Draingrates Self-maintaining, Lightweight, Economical, Safe

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IRVING SUBWAY GRATING CO., Inc.
Originators of The Grating Industry Est. 1902
Offices and Plants at:
6063 27th St., LONG ISLAND CITY 1, N.Y.
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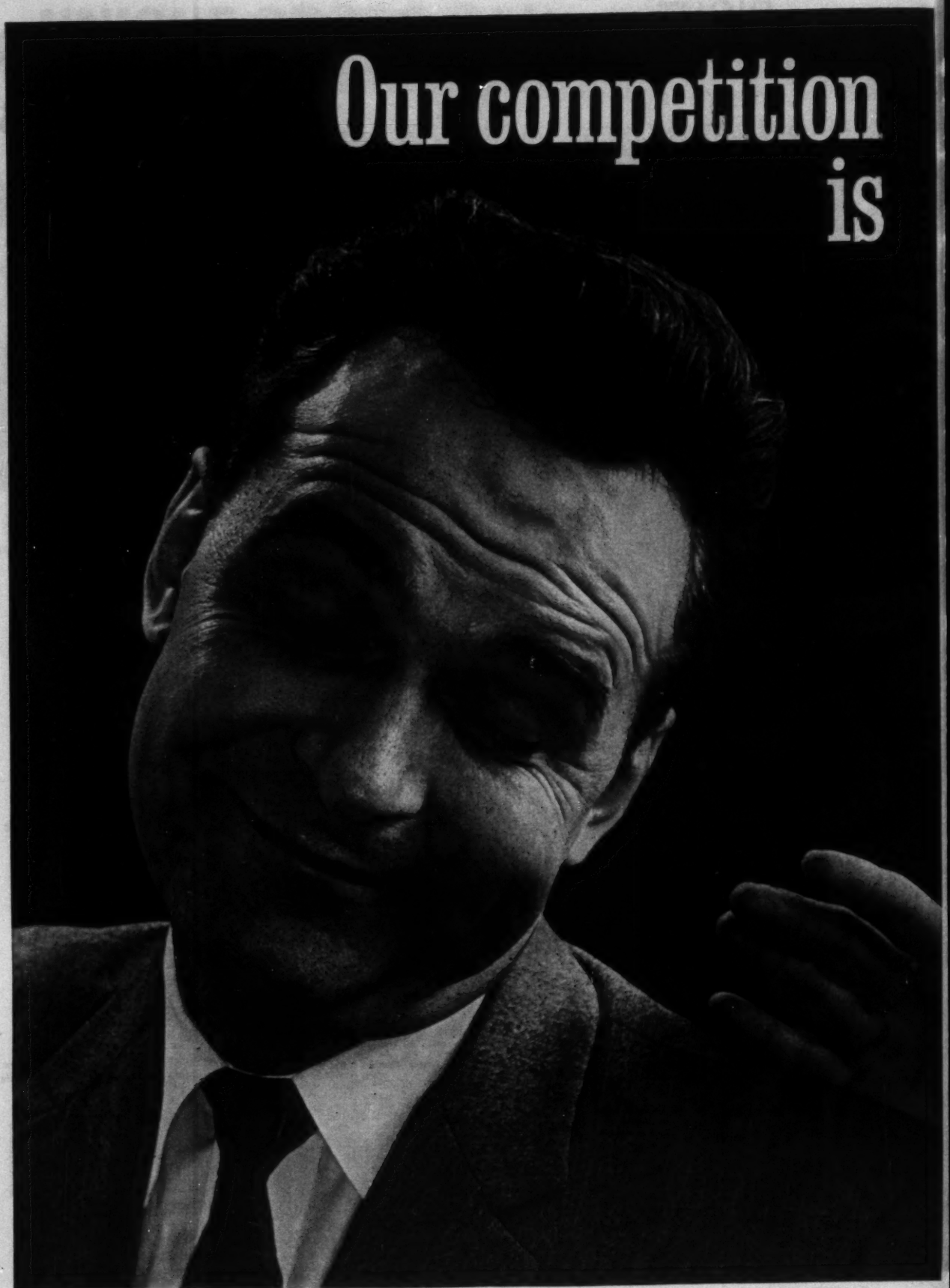
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That's why we at the Cast Iron Pipe Research Association feel so proud.

For 30 years we have been telling the public about the water problem.

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We were the first to inform the people of the need for action at the community level.

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We have been fighting the nation's water problem for over a generation.

And now other pipe companies are coming out with water campaigns, too.

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We're flattered.

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THE MARK OF THE 100-YEAR PIPE

CAST IRON PIPE RESEARCH ASSOCIATION.
Thos. F. Wolfe, Managing Director,
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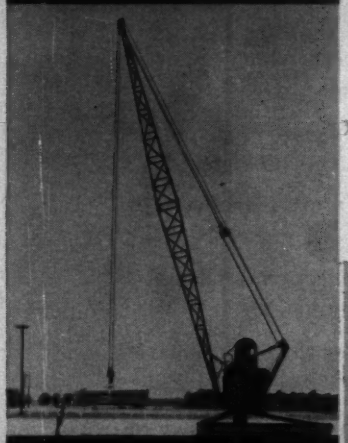
ELECTRIC CRANES FROM 6 TO 250 TONS CAPACITY

Pedestal Cranes, 6 to 25-ton capacity, mount in small area — operate on commercial power.

LeTOURNEAU full-revolving cranes, in load capacities from 6 to 250 tons, are winning an outstanding on-the-job reputation for economy, safety and precision. Here are the reasons: compact construction reduces space requirements for installation . . . counterweights and hook rollers are eliminated by special ball-socket suspension. Full-electric operation permits precision control of load — eliminates complicated drive systems. Individual high-torque LeTourneau Electric Motors drive each operating component directly through a constant-mesh gear train . . . always keep power on the load, both up and down. Fingertip electric switches provide instant control of starts and stops, braking, full 360-degree swing. For more information, write:



RD-25, with extra short tail swing, handles 25 tons in tight spaces.

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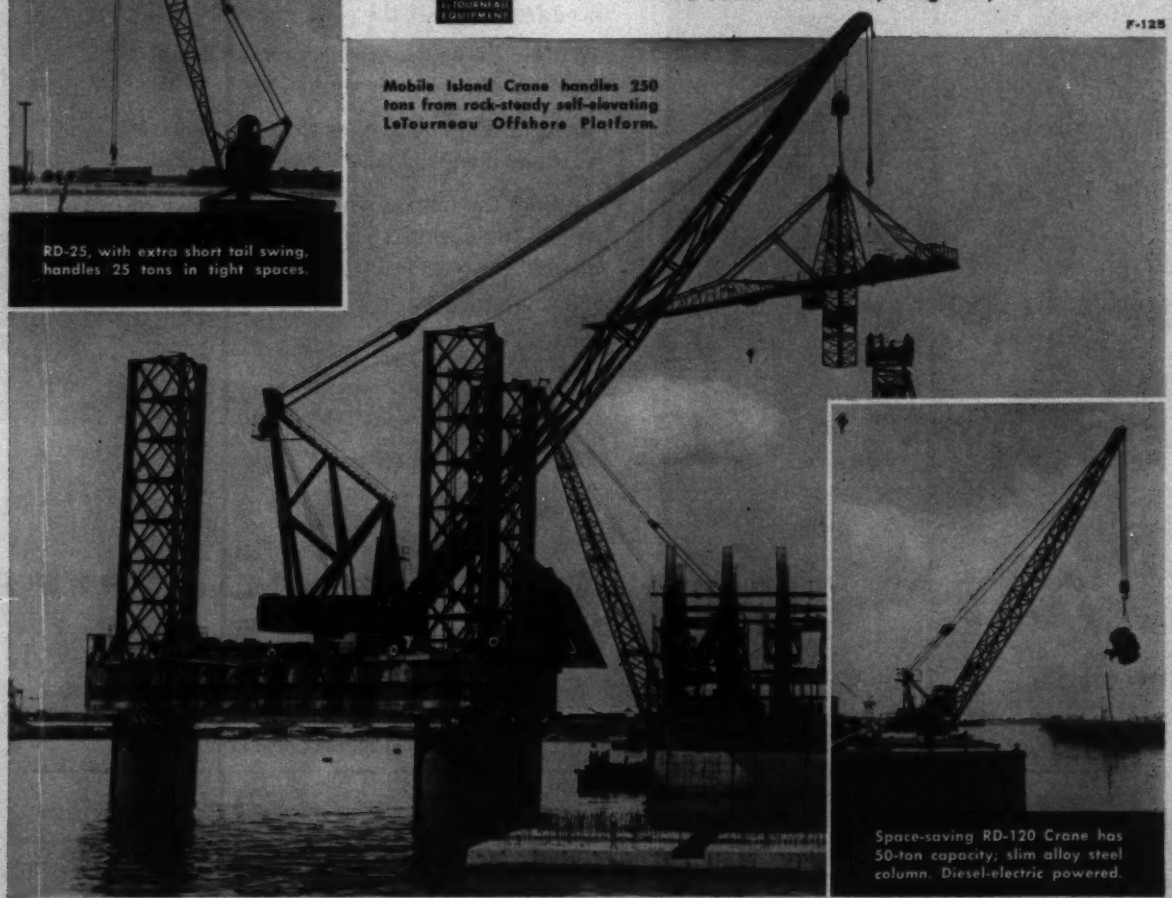

Mobile Island Crane handles 250 tons from rock-steady self-elevating LeTourneau Offshore Platform.

Space-saving RD-120 Crane has 50-ton capacity; slim alloy steel column. Diesel-electric powered.

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stay on the job 'til it's done to assure most profit per project

Built with exclusive Nygen cord, General Off-the-Road tires are the one sure way to protect and build job profits. Nygen cord construction means extra protection from costly in-the-field damage. And General's deep-digging, high flotation treads keep rolling whatever the going. From now on, be sure of less downtime, more profit . . . with Nygen-built General Tires on your units.

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Any weak spots that can lead to a loss? For full coverage, rely on Builder's Risk Insurance written by National Surety Corporation — a company backed by the **Fund of Experience.** Ask your agent or broker to outline the benefits of **each** form of Builder's Risk Insurance: Course of Construction ... Completed Value ... Reporting. The **right** form can mean savings for you when you insure with National Surety Corporation.

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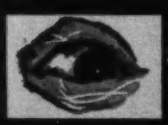

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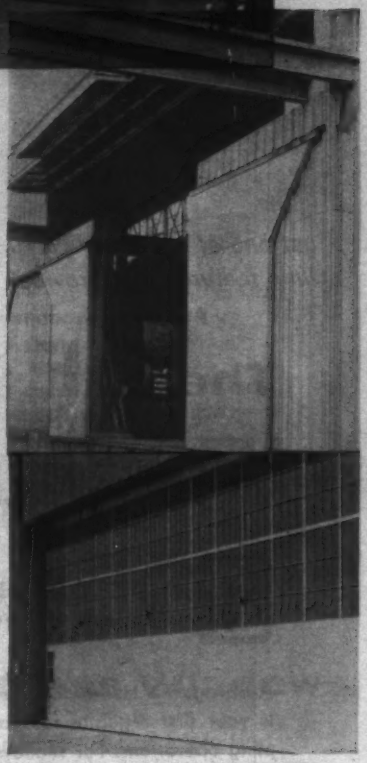

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Where a special opening problem exists, International Steel . . . America's major manufacturer of aviation and industrial doors . . . is now making available its long-experienced design and engineering personnel for use by other structural fabricators as well as by contracting and construction firms.

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AXIAL SHAFT ADJUSTMENT

provides regulation of capacity and head, and adjustment for impeller wear. This can be performed while pump is operating. Bulletin 4011-C.

Just one of the many Deming pump features that provide longer life and lower operating costs

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S&H PIPE DRIVING WINCH

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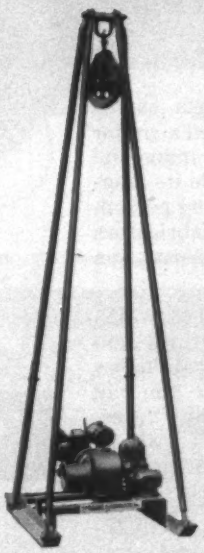

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(Continued from page 121)

▲ **Tex., Dallas**—COLLEGE—Bishop College, 301 N. Bishop St., Marshall, plans by Wyatt C. Hedrick consult. engr.-archt., 904 Fort Worth Ave., college, $1,000,000. CD 2/11/59.

▲ **Tex., Dallas**—STORE—Wynnewood Village, 201 Wynnewood, Professional Bld., plans by Williams & Reeves, 3400 University Blvd., department store, Zangs St. and Illinois Ave. $2,500,000. Montgomery Ward Co., lessee.

▲ **Tex., Fort Worth**—RESIDENCES—Aaron Rasti, 3518 Bluebonnet Circle, 175 brick veneer residences, Sycamore Creek addn. $1,750,000. W. R. Harvey, 6800 Meadowbrook, consult. engr.

▲ **Tex., Fort Worth**—APARTMENT—Thomas M. Ryan, First Life Bldg., masonry apartment. $1,000,000. Carter & Burgess, 1100 Macon, consult. engrs.

▲ **Tex., Houston**—MOTOR HOTEL—Continental Houston, 5648 Tupper Lake, motor-hotel, W. Commerce St. $3,000,000.

▲ **Tex., Lubbock**—MOTOR HOTEL—Continental Hotel, c/o Transwestern Developers, Inc., 2908 Slide Rd., plans by Cantrell & Burns, 4505 Ave. Q, 2 story, 70,000 sq. ft., 144 units, brick, air-conditioned motor hotel, 5th St. and College Ave., $1,000,000.

▲ **Tex., Midland**—MOTEL—Midland Air Terminal, Midland, plans by Jimmie Leath, archt & J. Frank Powell Associates, 100 North N. St., 100 unit luxury motel appurtenances, $1,200,000. CD 6/28.

▲ **Tex., Pasadena**—HOSPITAL—Texas Division of SIRE, c/o Sirof & Silvertsen, archts., 207 E. 37th St., New York, N. Y., 5 story, bsmnt., 108 bed hospital. Thomas and Tartar Sts. $1,000,000.

▲ **Alta., Edmonton**—MOTOR HOTEL—Western Motor Hotels Ltd., c/o William G. Milne, archt., 604 Leeson-Lineham Block, Calgary, 6 story, brick motor hotel, 100th Ave. and 104th St., $1,500,000.

▲ **Ont., Ottawa**—OFFICE, etc.—Kenson Constr. Co., 18 Rideau St., plans by Crang & Boake, 79 Huntley St., Toronto, 14 story office and apartment, Metcalfe St. $3,000,000.

▲ **Que., Montreal**—SCHOOL—School for Crippled Children, 1585 Cedar Ave., plans by Wiggs, Lawton & Walker, 3285 Cavendish Blvd., school for crippled children, Decarie Blvd. $3,500,000. CD 4/25.

INDUSTRIAL BUILDINGS

▲ **Conn., Hartford**—GAS PLANT—Hartford Gas Co., 233 Pearl St., plans by Charles DuBose, 780 Windsor St., gas plant for heating, air conditioning, Front St. Constitution Plaza, $3,000,000. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York, N. Y., consult. engrs. CD 7/26.

▲ **Conn., Montville**—PLANT—Chas. Pfizer & Co., Eastern Point Rd., Groton, 100,000 sq. ft. industrial plant, $1,000,000.

▲ **Del., Delaware City**—PLANT—Tidewater Oil Co., 79 New Montgomery St., San Francisco, Calif., and Collier Carbon & Chemical Corp., 714 Olympic St., Los Angeles, Calif., Naphthalene plant, near here. $3,000,000.

▲ **La., Baton Rouge**—PLANT—Allied Chemical Corp., 61 Broadway, New York 6, N. Y., polyethers plant, $5,000,000.

▲ **N. J., Paramus**—RESEARCH CENTER—Rexall Corp., Div. United Drug Co., Rivermoor St., Boston, Mass., research center, Century Rd. $3,000,000.

▲ **N. Y., Lackawanna**—SMOKE PRECIPITATORS—Bethlehem Steel Corp., 701 E. 3rd St., Bethlehem, Pa., smoke precipitators to cut smog, Lackawanna works, $5,000,000. CD 1/31/56.

▲ **N. C., Williamston**—PLANT—Williamston Development Comn., Williamston, clothing mfg. plant, $2,000,000.

▲ **Tex., Big Spring** — PLANT — Sid Richardson Carbon Co., Fort Worth Club Bldg., carbon black plant, 50,000,000 lb. annually, $2,750,000.

▲ **Tex., Orange**—PLANT—Firestone Tire & Rubber Co., Akron, O., and c/o 6602 Supply Row (Dist. Office), Houston, synthetic rubber manufacturing plant, $8,000,000. Day & Zimmerman, Inc., 1700 Sanson St., Phila., Pa., consult. engr. Bids in winter 1960 or Spring 1961, CD 3/30.

▲ **Tex., Pampa**—PLANT—Celanese Corp. of America, 180 Madison Ave., New York, N. Y., celanese plant, $4,000,000.

▲ **Wis., Brokaw**—FINISHING ROOM—Wausaw Paper Mills, Brokaw, 100,000 sq. ft. concrete steel, brick block Finishing Room Bldg. No. 1, $1,000,000, S. J. Baisch Assocs., 104 E. 2 St., Kaukauna, consult. engrs. Bids soon.

▲ **Wyo., Green River**—PLANT—Stauffer Chemical Co., 382 Madison Ave., New York 17, N. Y., soda ash plant, mining shaft, railroad bridge over Green River, railroad spur and highways.

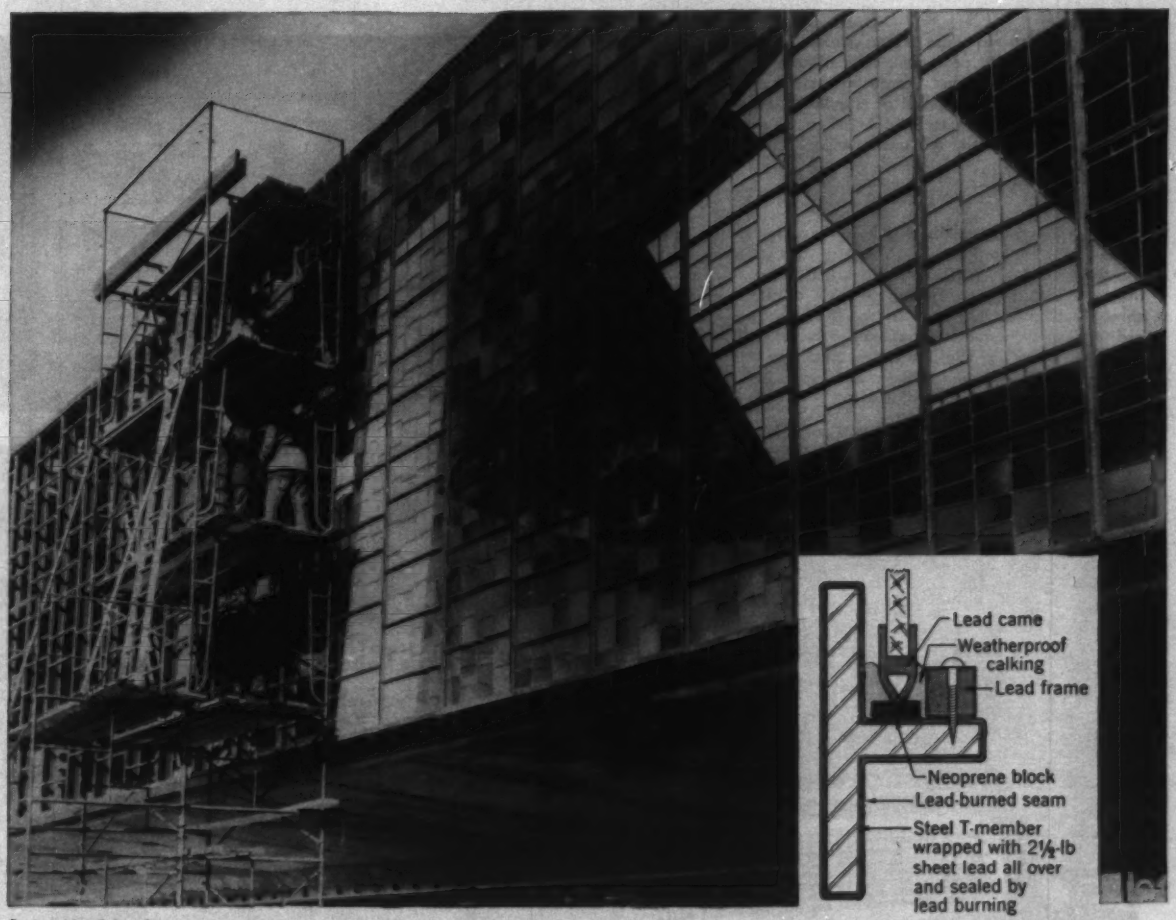
▲ **Ont., Hamilton**—MFG. PLANT—Columbian Carbon (Canada) Ltd., 7127 Park Ave., Montreal, Que., carbon black mfg. plant, Beach Rd. and Parkdale Ave. $5,000,000.

AMERICANS ABROAD

▲ **Japan**—PLANT—Oronite Chemical Co., 220 Bush St., San Francisco 20, Calif., U.S.A., and Nippon Petrochemicals Ltd., Tokyo, Japan, detergent polymer and alkylate plant, Kawasaki near Tokyo. $3,000,000.

FOREIGN

▲ **Algeria**—PLANT—Consortium of French Steel Companies (Societe Bonoise de Siderurgie) Bone, Algeria, steel plant, Bone. $164,000,000.


Lead came
Weatherproof calking
Lead frame
Neoprene block
Lead-burned seam
Steel T-member wrapped with 2½-lb sheet lead all over and sealed by lead burning

Designed by: Robert Sewer
Executed by: Rambusch Decorating Co.
Wrapping and Burning of Lead to Steel by John F. Abernathy & Co.
Architects: Kahn and Jacobs

Section through transom and light shows lead wrapping for the steel, lead came of the light, and the lead retaining frame.

Jet-Age Renaissance of Stained Glass Windows

Twenty-five tons of lead on the job...at New York's Idlewild International Airport. Lead serves as the "wrap" for the structural steel of the imposing stained glass window on the new American Airlines Passenger Terminal.

The non-objective stained glass window, which blends classic aesthetics with jet-age functionalism, extends 317 feet across the upper level of the terminal, and is 22½ feet in height. Lead helped make its construction possible and will make this window practically maintenance free.

The window consists of 78 panel frames, each holding 12 units composed of several pieces of stained glass held in place with lead cames. The frame structure is welded from steel T-sections to form mullions and transoms, which in turn are wrapped with 2½ lb. sheet lead. Hermetic sealing is achieved by lead-burning the seams so that the finished window is weatherproof, rattle-free and impervious to "sonic boom." A fitted lead retaining frame is secured with stainless steel screws to complete the structure.

Wrapping and burning 25 tons of lead onto structural steel, and the fabrication and glazing of 936 sections, requiring 3½ tons of lead, was readily accomplished and construction was completed several weeks ahead of schedule.

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LOOK AHEAD WITH LEAD

2549

Foremans' choice! This INTERNATIONAL pickup keeps the job moving by transporting key personnel, critical supplies or what have you to those important locations. Comfortable cab has 5 ft. wide seats, extra head-room. Take your choice of standard all-steel bodies or "Bonus-Load" bodies up to 8½-ft. long. A 266 cu. in. displacement V-8 engine gives outstanding power and gas mileage.

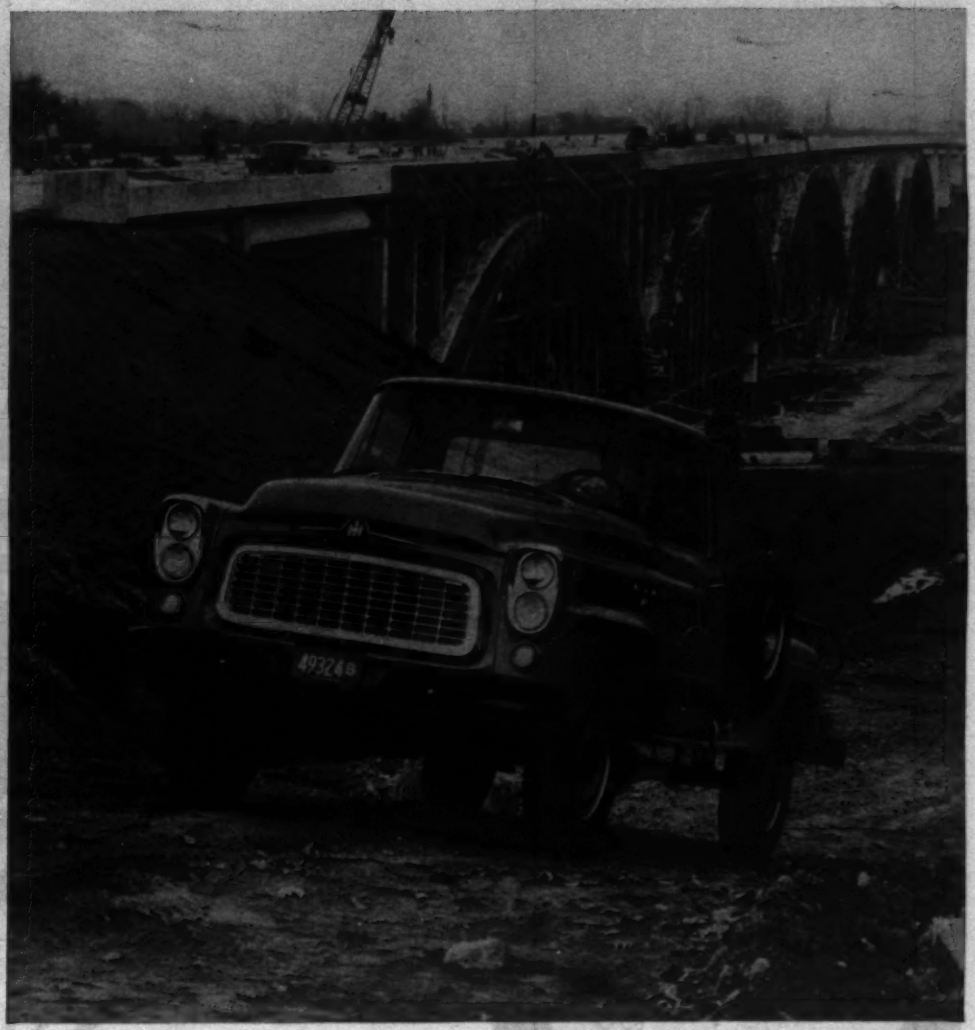
Ideal for servicing equipment and transporting supplies! Hauling loads any place you have to go, INTERNATIONAL stake models increase the speed and efficiency of your operation to cut down on costs. Heavy-duty brakes and springs mean longer life on rough jobs; wide cab seats three men comfortably. True-truck V-8 engines up to 197 hp. are standard to give you outstanding acceleration, constant road speed. Sturdy, economy "sixes" or the new economical INTERNATIONAL D-301 diesel engine are also available. Stake models up to 25,500 lbs. GVW give you a choice of regular or all-wheel-drive — factory installed stake bodies from 8 to 16 ft. long.

Together or individually

THEY BALANCE

These INTERNATIONAL® Trucks are only three examples of the large variety of units that INTERNATIONAL offers the construction field. They can supply an ideal balance to your operation with their speed and maneuverability. Combined with INTERNATIONAL dependability and rugged design, this all results in helping you get the job done right and on time . . . and totals up to bigger profits.

Stop in soon and see your INTERNATIONAL Truck Dealer or Branch for more details on the trucks built to boost your profit picture.



Ready to "hotshot" crews to any hot spot! This rugged INTERNATIONAL all-wheel-drive pickup can step out and over any terrain your construction crews will encounter. Sturdy design and powerful power-line give them the ability to go where others couldn't offer you the same efficiency. Choose from two pickup body types — extra-capacity "Bonus-Load" or standard. They are all-steel from husky sides and ribbed floor to sturdy, sand-tight tailgate. Take your power from standard V-8 or true-truck "six" engines.

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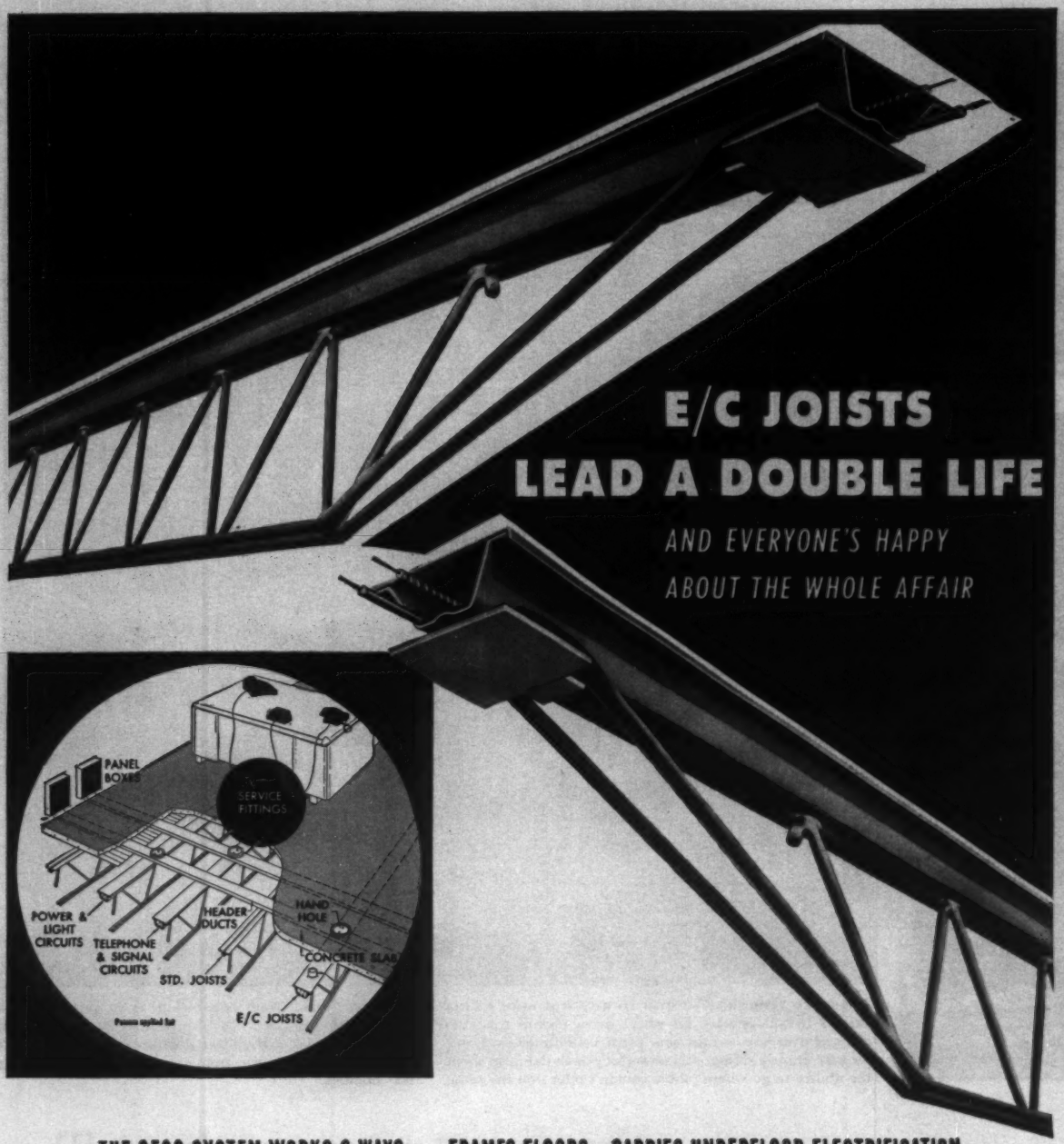

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Buildings to be truly modern need underfloor electrification . . . on that everyone agrees. And when a system serves a double purpose it's worth investigating. So look into the Ceco Electro-Channel Steel Joist System which carries both the electrical and structural loads. With the savings inherent in steel joist construction, underfloor electrification is now practical for almost any new building, large or small. Send for facts. Ceco Steel Products Corporation. Sales offices, warehouses and fabricating plants in principal cities. General offices: 5601 West 26th Street, Chicago 50, Illinois.

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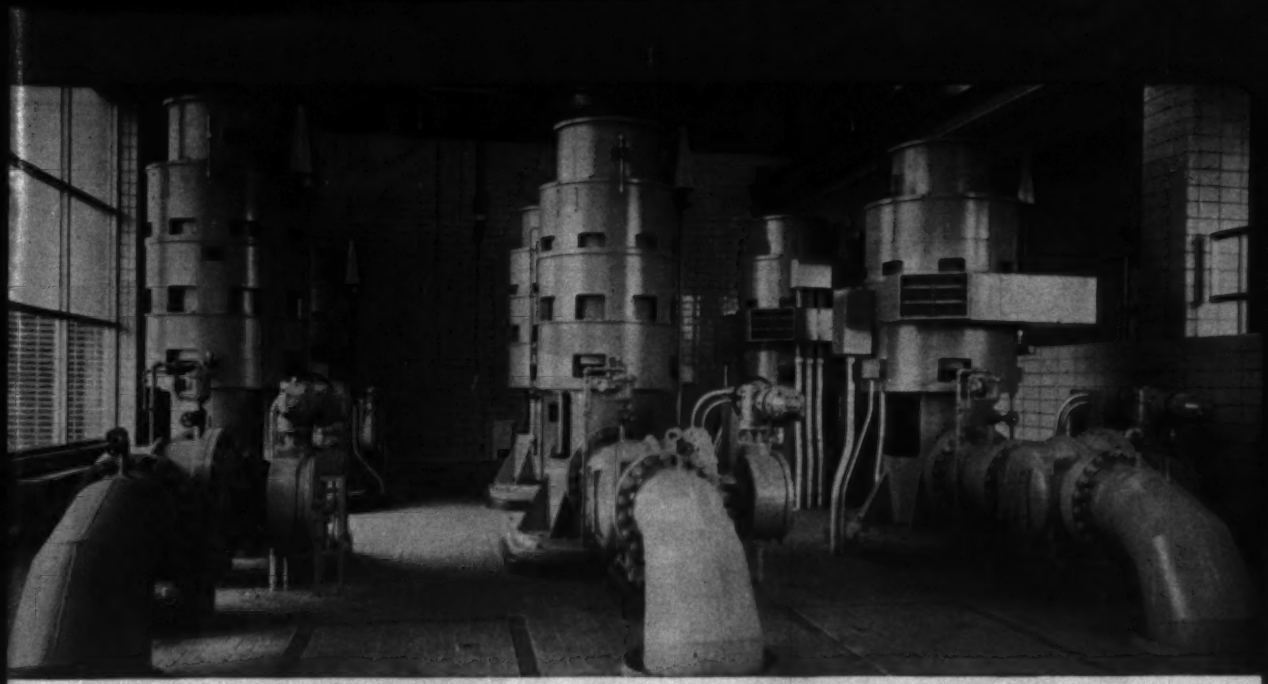
TOTAL MANUFACTURING FOR THE BUILDING INDUSTRY FROM RAW TO FINISHED PRODUCTS



PLENTY OF WATER for Springfield-66 MILLION GPD Max.

Springfield, Ohio has a completely new, automatic water supply system by Layne. It guarantees 66 million gallons per day for their present and future needs—a job complete by Layne—and a completely satisfied customer. Field Tests exceeded the guaranteed pump efficiencies by 1% to 2% on all units. Consulting Engineers: Black and Veatch, Kansas City Missouri. Water Supply Contractors: The Layne Ohio Company, Columbus, Ohio. Do you need complete water service? Get it from Layne. Write for Bulletin 100.

Specifications

RAW WATER—10 Layne Gravel Wall Wells with Layne 18-8 Stainless Steel shutter screen and 10 Layne deep well pumps. 2800 GPM — 65 ft. TDH, 75 hp—440 Volts— 1750 RPM, located in two banks pumping to the filter beds. Pumps were installed 15 feet above ground level for flood protection.

FILTERED WATER—Six Layne high service pumps boosting filtered water into distribution system. Five are 12 MGD-285 ft. TDH, 700 hp—4160 volts—1185 RPM. Two are variable speed units. The sixth Layne Pump is a 6 MGD-285 ft. TDH, 400 hp—4160 volts —1185 RPM. All pumps operate through the central control panel.

City of Springfield, Ohio

LAYNE OFFERS COMPLETE WATER SERVICE: Initial Surveys • explorations • recommendations • site selection foundation and soil-sampling • well drilling • well casing and screen • pump design, manufacture and installation construction of water systems • maintenance and service • chemical treatment of water wells • water treatment—all backed by Layne Research. *Layne services do not replace, but coordinate with the services of consulting, plant and city engineers.*

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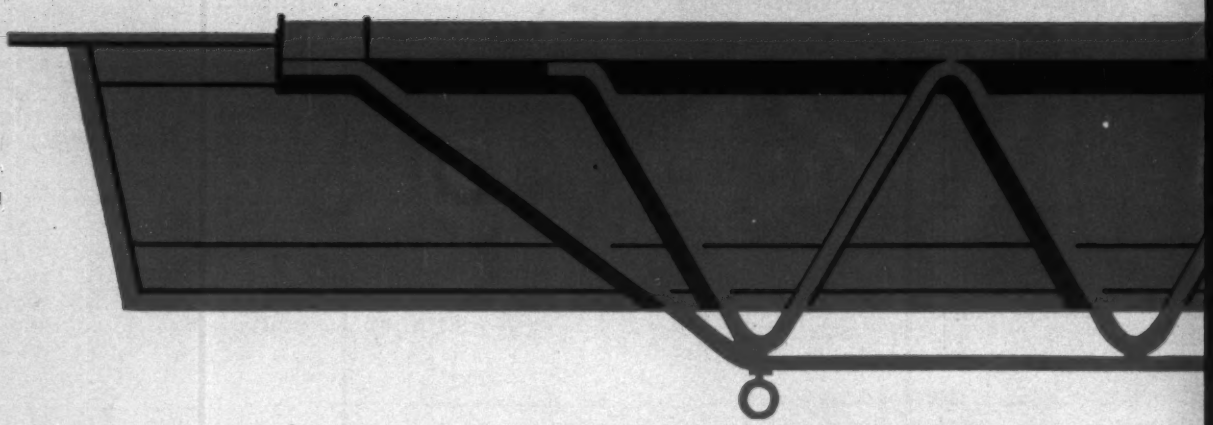
CONCRETE SHORING



SAVE TO 40% WITH THIS MODERN SHORING METHOD!

Stop the time and manpower wastes of "custom-built" shoring. Switch to Spanall—the factory-built, high-strength steel shoring that instantly adjusts to any span requirements. Spanall is telescopic for precision sizing, ease of handling, fast erection. Built-in camber compensates for load deflection. The elimination of "hodge-podge" vertical shoring gives added advantage of obstruction-free space below for workmen and storage. Save with Spanall on all your floor and deck shoring jobs as well as slabs of special shapes and sizes.

CALL THE REX-SPANALL DEALER NEAREST YOU—LET SHORING SPECIALISTS ENGINEER YOUR JOB!

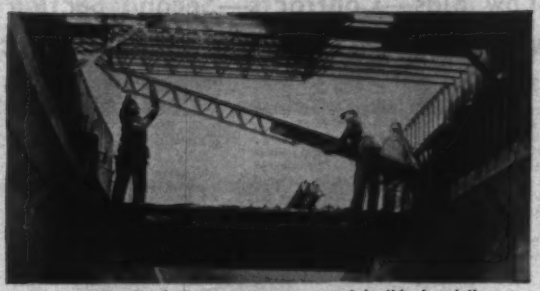
ARKANSAS: Finke & Williams, Inc., Little Rock • CALIFORNIA: Burke Concrete Accessories, Inc., San Francisco, Los Angeles, Oakland, San Bernardino, San Diego, Sacramento • COLORADO: K. C. Construction Supply Co., Inc., Denver • CONNECTICUT: Universal Builders Supply Co., Inc., New York • WASHINGTON, D.C.: Spanall Of The Southeast, Inc., Alexandria, Va. • DELAWARE: Furnival Machinery Company, Philadelphia • FLORIDA: Southern Spanall, Inc., Fort Lauderdale, Winter Park • INDIANA: Moss Engineering Corporation, Fort Wayne; M. S. Churchman Co., Indianapolis; American Builders Supply Co., Louisville, Ky. • IOWA: Edwards & Browne Co., Omaha, Nebr. • KANSAS: Victor L. Phillips Co., Wichita • KENTUCKY: American Builders Supply Co., Louisville, Lexington • LOUISIANA: H. S. Finke Corporation, New Orleans • MAINE: Universal Builders Supply Co., Inc., Framingham, Mass. • MASSACHUSETTS: Universal Builders Supply Co., Inc., Framingham • MARYLAND: Spanall of the Southeast, Inc., Alexandria, Va. • MICHIGAN: Safway Steel Scaffolds, Inc., Detroit; Metal Building Specialties Co., Kalamazoo, Grand Rapids, Lansing • MINNESOTA: The Zeco Company, Minneapolis, Duluth, Hibbing • MISSOURI: Victor L. Phillips Co., Kansas City; Missouri Construction Machinery Co., St. Louis • NEBRASKA: Edwards & Browne Co., Omaha • NEVADA: Burke Concrete Accessories, Inc., San Francisco • NEW HAMPSHIRE: Universal Builders Supply Co., Inc., Framingham, Mass. • NEW JERSEY: Universal Builders Supply Co., Inc., New York; Furnival Machinery Company, Philadelphia • NEW MEXICO: K. C. Construction Supply Co., Denver, Colo.; Burke Concrete Accessories, Inc., Albuquerque • NEW YORK: Universal Builders Supply Co., Inc., New York, Syracuse • NORTH CAROLINA: Spanall of the Southeast, Inc., Durham • NORTH DAKOTA: Midwest Equipment Company, Bismarck, Fargo • OKLAHOMA: Victor L. Phillips Co., Oklahoma City, Tulsa • OHIO: Safway Steel Scaffolds, Inc., Akron, Cleveland, Toledo; E. W. Harman Company, Columbus; F. E. Longstreth Company, Dayton; Durbrow-Otte Associates, Inc., Cincinnati • OREGON: Burke Concrete Accessories, Inc., Portland • PENNSYLVANIA: Furnival Machinery Company, Philadelphia, Harrisburg, New Philadelphia; Dravo-Doyle Company, Pittsburgh • RHODE ISLAND: Universal Builders Supply Co., Inc., Framingham, Mass. • SOUTH CAROLINA: Spanall of the Southeast, Inc., Durham, N.C. • TENNESSEE: Finke & Williams, Inc., Memphis; Wilson-Weesner-Wilkinson Co., Inc., Nashville, Knoxville • TEXAS: Dixie Form and Steel Company, San Antonio • UTAH: K. C. Construction Supply Co., Denver, Colo. • VERMONT: Universal Builders Supply Co., Inc., Framingham, Mass. • VIRGINIA: Spanall of the Southeast, Inc., Alexandria • WASHINGTON: Burke Concrete Accessories, Inc., Seattle • WEST VIRGINIA: Safway Steel Scaffolds, Inc., South Charleston; Dravo-Doyle, Pittsburgh, Pa. • WISCONSIN: Hunter Machinery Company, Inc., Milwaukee, Green Bay, Eau Claire.

THE COMPLETE REX-SPANALL LINE — WHAT YOU NEED, WHEN YOU WANT IT, RENTAL OR SALES

REX-SPANALL 46
Channel-shaped steel members for formwork from 4'2" to 6'11".

REX-SPANALL 610
For medium-span building and bridge formwork. Telescopic members adjust from 6'1" to 10'2".

REX-SPANALL 1015
Perfect for multi-story form construction with adjustable spans from 9'11" to 21'.



Thousandths-of-an-inch accuracy was a must in this foundation for the huge new Brookhaven Synchrotron. Spanall simplified roof formwork with its precision expansion feature. Foundation contractor: Stone & Webster Engineering Corporation.

Bridge construction speeded with Spanall. Time and manpower savings are apparent here where Spanall eliminated difficult vertical shoring for a width addition to the George Washington Bridge, New York. Contractor: Tully and DiNapoli, Inc.

REX-SPANALL 730
The standard truss assembly for long-span and heavy-load formwork from 7' to 30'.

REX-SPANALL VERTICAL SHORING
Easily handled telescopic shoring has precision adjustment for rapid setting. Available in three sizes from 5'7" to 14'1".

REX® SPANALL

Subsidiary of CHAIN Belt Company, Rex-Spanall, Inc., 6427 West Capitol Drive, Milwaukee 16, Wisconsin. Export: Rex-Spanall International, S.A., Santurce, Puerto Rico

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—BA

Conn., Wethersfield—PLUMBING, etc.—BA 8/31—State Public Works Comr., 165 Capitol Ave., Hartford, Proj. BI-28-93 Mechanical Trades, Labor Dpt. Office Bldg., plumbing, heating and ventilating and electrical. Plans deposit $55. Golden-Storrs Assocs., 1232 Farmington Ave., West Hartford, archts. Saml. Glasser Assocs., 234 Clarendon Rd., Boston, Mass., engrs. CD 12/3.

▲ Mass., Attleboro—SCHOOL—BA 9/19—City, Sanford St., Senior High School and Vocational School, Capron Park. $3,000,000. Plans deposit $200. Perley F. Gilbert Assoc., Inc., Sun Bldg., Lowell, archt. CD 6/24/58.

HEAVY CONSTRUCTION—LB & CA

▲ MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 8/9, Marinucci Bros. & Co. Inc., 51 Ceylon St., Dorchester, Mass., LB $8,644,782, est. $7,377,175 hy. and bridge Interstate Rte. 93.193-1(18) 1&U-309(6), Medford. CD 8/5.

BUILDINGS—LB & CA

▲ Frouge Constr. Co., Inc., 141 North Ave., Bridgeport, Conn., LB $1,763,000 (10 bidders), five buildings, 140 units low rent HOUSING, Proj. Conn. 11-1, MERIDEN, CONN. Meriden Housing Authority, 46 Broadvale Rd., Meriden, Conn. Bids Aug. 9. CD 8/2.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ PENNSYLVANIA—BA 8/30—Pennsylvania Turnpike Comn., Harrisburg,
100 mi. medial strip guard, steel, or aluminum rail, $2,500,000. CD 10/28/53.

BUILDINGS—BA

▲ D. C., Wash.—HEADQUARTERS—BA 9/5—National Lumber Manufacturers Assocs., 1319 18th St. N.W., (selected list bidders) headquarters, Massachusetts Ave., near Scott Circle N.W. Plans deposit $75. Keyes, Lethbridge & Condon, 1300 Connecticut Ave. N.W., archts.

▲ N. Y., New York—SCHOOL—BA 11/17—Bureau Constr., Bd. Educ., 45-12 Crescent St., Long Island City, Proj. E-472, P. S. 154, E. 136 St. and Alexander Ave. $2,300,000. M. Radoslovich, c/o owner, archt. CD 12/9/58.

HEAVY CONSTRUCTION—LB & CA

▲ NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton,
rejected bids July 7, more than 4,000,000 ft. sand drains within portions of Teaneck, Englewood and Leonia, Interstate Rte. 95, Overpeck Creek Meadow Area, Bergen Co. LB $6,802,786. Will re-advertise. CD 7/11, under LB.

▲ The De Forest Co., Rd. No. 1, Mechanisburg, Pa., LB $5,421,000, (14 bidders), Conowingo Intake and Tunnels, Susquehanna River Water Supply Section No. 3, BALTIMORE, MD. City, Bureau Water Supply, 3001 Druid Park Dr., Baltimore 15, Md. Bids Aug. 10. CD 8/2.

BUILDINGS—LB & CA

▲ Diesel Constr. Co., 642 5 Ave., New York, N. Y. CA Est. $50,000,000, 50 story, 2,000-room, concrete frame air conditioned Americana West HOTEL, incl. swimming pool, 7 Ave. between 52 and 53 Sts., NEW YORK, N. Y. Loew's Theatres, Inc., 1540 Broadway, New York N. Y. Morris Lapidus, 139 E. 56 St., New York, N. Y., archt. Alfred J. Kleinberger, 551 5 Ave., New York 17, N. Y., consult. engr. Rutherford Stinard & Assocs., 801 2 Ave., New York 17, N. Y., mechanical engrs. Farhas & Barron, 5 Beekman St., New York 38, N. Y., structural engrs.

▲ Horn Constr. Co., Inc., 225 W. 34 St., New York 1, N. Y., LB $1,758,790, (5 bidders), Contr. PN-630.001, wharf, Berths 34, 36 and 65, PORT NEWARK, N. J. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Aug. 9. CD 7/18.

▲ Parkway Constr. Inc., 65 E. 55 St., New York, N. Y., CA Est. $3,200,000, 10 story, 169-unit APARTMENT, NEW BRUNSWICK, N. J. Bishop Towers, Inc., c/o Fidelity Union Trust Co., Broad St., Newark, N. J. Turano-Gardner Assoc., 65 E. 55 St., New York, N. Y., archts.

▲ Irwin & Leighton, 1505 Race St., Phila., Pa., CA $3,000,000, 300 room MARRIOTT MOTOR HOTEL, pool, rink, restaurant, Monument Rd. and City Ave., Lower Merion Twp. BALA CYNWYD, PA. William B. Tabler, 401 7th Ave., New York, N. Y., archt. Wayman C. Wing, 411 7th Ave., New York, N. Y., structural engr. Cosentini Assocs., 10 Columbus Circle, New York, N. Y., mechanical engrs. CD 6/23.

▲ Wellington Apts., Inc., E. J. Frankel, 2201 Pennsylvania Ave., Phila., Pa., Owner Builds, $1,900,000, conversion Rittenhouse Sq. Bldg. to APARTMENT HOUSE, NE corner 19th and Walnut Sts., PHILA., PA.

▲ A. I. Cassell Land Corp., 1925 14 St. N.W., Wash., D. C., Owner Builds, $15,000,000 ultimate, $2,000,000 First Year, COMMUNITY DEVELOPMENT, 800 HOMES, 300 APARTMENTS, SHOP CENTER, 900-car parking, 38 unit MOTEL, marina, swimming pool, roads, 20 acre, Chesapeake Heights, on Chesapeake Bay, near PRINCE FREDERICK, MD.

▲ Altimont Brothers, Inc., 4929 Bethesda Ave., Bethesda, Md., CA $1,134,000, SCHOOL SERVICE BLDG., site of Carver High School, ROCKVILLE, MD. Montgomery County Bd. Educ., Rockville, Md. Bids July 15. CD 7/20, under LB.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ VIRGINIA—State Dpt. Hys., 1221 E. Broad St., Richmond,
Va.—J. O. & C. M. Stuart, Inc., 3121 South St., NW, Wash., D. C., CA $2,447,080, grading, drainage 6.86 mi. Inter. 66, 0.39 mi. west of Centreville to 0.8 mi. east of US 50, bypassing Centreville and Fairfax, Fairfax Co.; CA $965,565, grading, drainage 1.9 mi. Inter. 66, 0.8 mi. east of US 50 to 0.57 mi. east of Rte. 123, Fairfax Co.;
Va.—V. N. Green & Co., Inc., 1640 Fourth Ave., Charleston, W. Va., CA $1,538,854, grading, drainage 3.7 mi., first section of Marion bypass, 2.44 mi. west of Marion to 0.45 mi. west of Rte. 16, Smyth Co.;
Va.—Adams Constr. Co., 2725 Roanoke Ave., Roanoke, Va., CA $653,921, paving, etc, 5.82 mi., Va. R.R. overpass at Meherrin to US 15, on US 360, Charlotte and Prince Edward Counties;
Va.—Laramore Constr. Co., P. O. Box 1656, Danville, Va., CA $505,583, relocate, reconstr. 1.67 mi., US 58, east corporate line of Martinsville; east, Henry Co.;
Va.—Bowers Constr. Co., 805 W. South St., Raleigh, N. C., CA $832,815, five bridges at interchange at Telegraph Rd. (Rte. 241), Inter. 413 (Capital Beltway), Fairfax Co., Grand Total $6,913,818. Bids 7/29. CD 8/4 under LB.

▲† Johnson, Drake & Piper Inc., Baker Bldg., Minneapolis, Minn., CA $5,316,147, hydro electric power plant, Hartwell Dam, Savannah River, GEORGIA. U. S. Eng., 200 East St. Julian St., Savannah, Ga., Bids 8/2. CD 6/7.

▲ A. E. Burgess Co., Inc., Pinson Hy., Birmingham, Ala., CA Total est. $2,500,000, clearing, grading for water filtration plant, BIRMINGHAM, ALA. City, City Hall, Birmingham, Ala. Bids July 19. CD 7/15.

▲† J. L. James & Co., Ruston, La. and Sabine Dredging & Constr. Co., Inc., 708 Marian Anderson St., Port Arthur, Tex., CA $1,758,885, channel excav. Chicot Pass near Baton Rouge, St. Martin and Iberia Parishes, Inv. 60-231, LOUISIANA. U. S. Eng., P. O. Box 2767, New Orleans, La. Bids July 20. CD 8/1, under LB.

▲ KENTUCKY—State Dpt. Hys., Frankfort,
Hinkle Contg. Co., Box 147, Paris, Ky., CA $2,096,752, b. conc. surf. 8.396 mi. Lexington-Catlettsburg, I 64-5 (8) 100, Clark and Montgomery Counties. Bids July 29. CD 8/2, under LB.

BUILDINGS—LB & CA

▲ Community Builders, Inc., 8605 Cameron St., Silver Spring, Md., CA Est. $2,000,000, APARTMENTS, RICHMOND, VA. Three Chopt Corp., 2020 W. Broad St., Richmond, Va. Joseph Saunders & Assocs., 3636 King St., Alexandria, Va., and Norman Giller & Assoc., 975 Arthur Godfrey Rd., Miami Beach, Fla., archts. CD 12/24.

▲ Eskew Builders & Development Co., 2550 Fairburn Rd., SW, Atlanta, Ga., Day Labor, $3,300,000, 165 RESIDENCES, Loch Lomond subdivision, ATLANTA, GA.

▲ S. J. Curry & Co., P.O. Box 1436, Albany, Ga., LB $2,017,000, HOSPITAL, NEWNAN, GA. Coweta Co. Hospital Auth., Newnan, Ga. CD 7/26.

▲† Florida Builders, Inc., 700 43rd St. S, St. Petersburg, Fla., LB $8,171,300, Base Bid (3 bidders), 500 units CAPEHART HOUSING, U. S. Naval Base, Key West Naval Air Station, NBy 29105, KEY WEST, FLA. Dist. P. Wks. Office, 6th Naval Dist., Bldg. 13, US Naval Base, Charleston, S. C. Bids opened Aug. 9. CD 7/26.

▲ Robert Turchin, Inc., 1835 Purdy Ave., Miami Beach, Fla., CA Approx. $6,000,000, Morton Towers APARTMENTS, Bayshore Dr. and 15th St., MIAMI BEACH, FLA. Morton Bros., 1101 NE 79th St., Miami, Fla. Melvin Grossman, 420 Lincoln Rd., Miami Beach, Fla., archt. Oboler & Clarke, 927 Arthur Godfrey Rd., Miami Beach, Fla., engrs.

▲ W. H. Cooper Constr. Co., P.O. Box 3537, University Station, Gainesville, Fla., LB $2,421,000 (15 bidders), STATE OFFICE, Florida State Capitol Center, TALLAHASSEE, FLA. Bd. Comrs. State Institutions, 2nd Floor Center Wing, State Capitol, Tallahassee, Fla. Bids Aug. 4. CD 7/25.

▲ C. F. Braun & Co., 1000 S. Fremont Ave., Alhambra, Calif., CA Est. $10,000,000-$15,000,000, polybutadiene and polisopropane CHEMICAL PLANT, LOUISVILLE, KY. American Rubber & Chemical Co., Camp Ground Rd., Louisville, Ky. CD 7/13.

▲ Hargett Constr. Co., 113 Walton Ave., Lexington, Ky., LB $1,594,195, LABORATORY, Eastern State College, RICHMOND, KY. Commonwealth of Ky., Div. Purchases, Frankford, Ky. Bids Aug. 10. CD 7/26.

MIDDLE WEST

▲ O., Cleveland—SCHOOL—BA 9/2—Bd. Educ., 1380 E. 6th St., Zone 14, Churchill-Orville Aves., Junior High School. $2,200,000. Plans deposit $10. Earl Shobe, c/o owner, engr. CD 8/5.

HEAVY CONSTRUCTION—LB & CA

▲† Cheney & James Constr. Co., Box 1363, Dallas, Tex., LB $5,698,684, est. $6,024,013, (15 bidders), Aircraft Laboratory Fatigue TST(SONIC), Wright Patterson Air Force Base, ENG-15-029-50-44, DAYTON. O. U. S. Eng., Box 59, Louisville 1, Ky. Bids Aug. 10. CD 7/27.

▲ MICHIGAN—State Hy. Dpt., 732 Mason Bldg., Lansing,
Hallaway Constr. Co., 29350 Jay Rd., Livonia, Mich., CA $3,676,378, 7.8 mi. US 12 freeway Int. 94 incl. five structures from Snow Rd. south of Bridgman north to Ridge Rd., north of Stevensville, Berrien Co. Bids Apr. 27. CD 5/4, under LB.

BUILDINGS—LB & CA

▲ Alvin Constr. Co., 18009 Holland Rd., Brook Park, O. Own Forces, $1,980,000, 111 HOMES, Simmons-Taylor Subdivision, BROOK PARK, O.

▲ F. A. Wilhelm, 3914 Prospect St., Indianapolis, Ind., LB $2,577,790 (7 bidders), FINE ARTS and RADIO-TELEVISION Bldg., Indiana University, BLOOMINGTON, IND. Indiana University, Trustees, Bloomington, Ind. CD 10/2/58.

▲ Dravo Corp., Neville Island, Pittsburgh 25, Pa., CA OXYGEN PLANT, 280 tons per day gaseous oxygen, 10 tons liquid, 1.4 tons liquid nitrogen by German process, DEARBORN, MICH. Ford Motor Co., The American Rd., Dearborn, Mich.

MISSISSIPPI TO ROCKIES

BUILDINGS—LB & CA

▲† Cedric Sanders, 115 E. St. Andrews Pl., Santa Ana, Calif., CA $5,997,514, 366 unit Capehart HOUSING Grand Forks Air Force Base, GRAND FORKS, N. D., Base Procurement Office, Grand Forks Air Force Base, Grand Forks, N. D. Fox Stanley Engineering Co., 221 N. 5th St., Grand Forks, N. D., archt. CD 4/7.

▲ Bechtel Corp., 220 Bush St., San Francisco, Calif., CA Est. $4,000,000, 13,000 bbl. LUBRICATING OIL PLANT, PORT ARTHUR, TEX. Gulf Oil Corp., Port Arthur, Tex. CD 8/7/56.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ Calif., San Diego—BA 8/31—City, Rm. 161, Civic Center, Zone 1, Miramar Filtration Plant and reservoir. $3,600,000. Plans deposit $50. Extended date. CD 7/26.

HEAVY CONSTRUCTION—LB & CA

▲ Kirst Constr. Co., 836 West Woodbury Rd., Altadena, Calif., CA $3,446,268 Encino Dam and Reservoir imprvs. LOS ANGELES, CALIF. Los Angeles Water & Power Dpt., 316 W. 2 St., Los Angeles, Calif. Bids July 5. CD 7/7, under LB.

▲ Moses Akiona Ltd., 1145 Gulick Ave., Honolulu, Hawaii, LB $1,839,361, (6 bidders), Imprvt. section Pali Hy., Job No. 8147, HONOLULU, HAWAII. City and Honolulu County, City Hall, Punch Bowl and King Sts., Honolulu, Hawaii. CD 7/21.

BUILDINGS—LB & CA

▲† M. R. Fisher, Inc., 10835 Santa Monica Blvd., Los Angeles, Calif. and Western Constr. Corp., 13741 Riverside Dr., Los Angeles, Calif., LB $1,735,000, (5 bidders), 106 units Capehart HOUSING, U. S. Naval Auxiliary Air Station, NBy (CH) 29273/60, FALLON, NEV. Dist. P. Wks. Office, 12th Naval Dist., San Bruno, Calif. Bids Aug. 5. CD 7/28.

▲ O. L. Carpenter, 8995 Imperial Ave., Lemon Grove, Calif., CA $2,013,099, Sweetwater Springs HIGH SCHOOL, Grossmont, LA MESA, CALIF. Grossmont Union High School Dist., Grossmont High School, La Mesa, Calif. Bids Aug. 5, awarded Aug. 8. CD 8/10, under LB.

CANADA

BUILDINGS—LB & CA

▲ Provincial Dpt. Health, Parliament Bldgs., Quebec City, Que., contract cancelled, 4 story, 52x186 ft. wings., OLD PEOPLES HOME, ST. TITE, QUE. CA Est. $2,000,000. Will re-advertise. CD 6/22, under CA.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲† The Martin Co., Middle River St., Baltimore, Md., CA Est. $3,950,678, 1,500 elec. KW REACTOR PM-3A, pressurized water type, moderated and cooled with light water, fabricate and erect, test and operated at McMurdo Sound, ANTARCTICA. U. S. Atomic Energy Comn., Wash. 25, D. C.

(Proposal Advertisements see pp. 150 to 153)

NORTH

EAST

SOUTH

WEST

BACK TO SCHOOL(S)

Some of the educational institutions Lord Electric Company has served: United States Naval Academy; Williams College; Rockefeller Institute; New York Law School; Union Theological Seminary; Convent S.H.M. Marymount, Tarrytown, N. Y.; St. Bernards School, New York City; Harvard University; Columbia University; Yale University; Vassar College; Brearley School, New York City; Connecticut College For Women; St. Marks School, Southboro, Mass.; Mather District School, Boston; Brookline, Mass. High School; Allston School, Boston; Sherwin School, Boston; Boston Latin School; Middlesex School, Concord, Mass.; Massachusetts Institute Of Technology; Mechanics Art High School, Boston; Wellesley College; Mt. Holyoke College, South Hadley, Mass.; Dartmouth College; Boston College; Simmons College, Boston; Wm. E. Russel School, Dorchester, Mass.; Andover, Mass. Theological Seminary; Perkins Institute For The Blind; Franklin Union, Boston; N.E. Conservatory Of Music, Boston; West Philadelphia High School; Gilbert Stewart School, Dorchester, Mass.; New York State Education Building; Hunter College; Kennewick Jr. High School, Kennewick, Wash.; Waldo Jr. High School, Salem, Ore.; Judson Jr. High School, Salem, Ore.; Pittsburgh University; Portland (Oregon) State College; Princeton University; Northeastern University, Boston.

We are particularly pleased that so much of Lord's work in America's schools is done under repeat contracts.

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Electrical Contractors to the Nation Since 1895

NEW YORK
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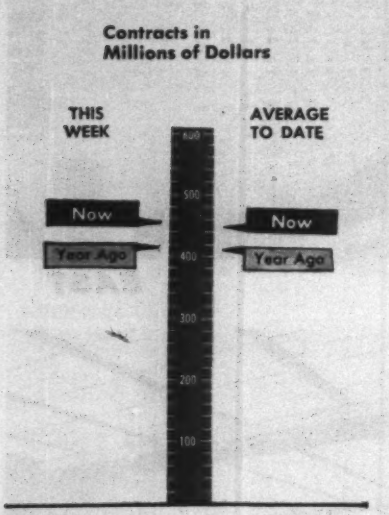
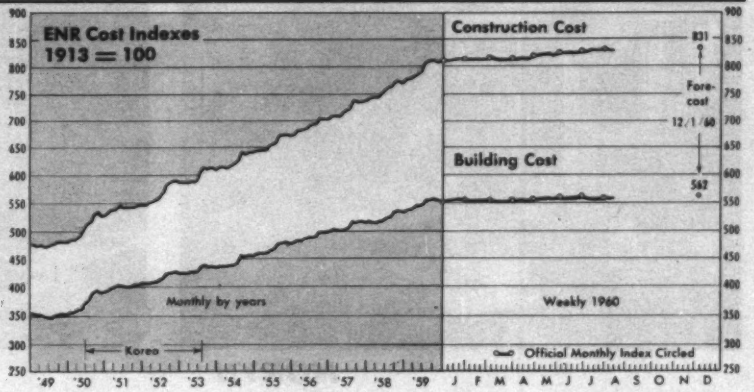
Construction Scoreboard

This Week . . .





ENR INDEXES (1913=100), 20-cities' average	Week of Aug. 11 1960	% Change from July 14 1960	% Change from Aug. 13 1959
Construction Cost	829.86	−0.08	+2.2
Building Cost	561.30	+0.09	+1.1

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

AMOUNT OF CONTRACTS LET

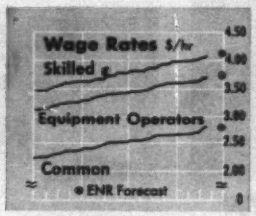
Contracts Awarded In 50 States By Type	This Week millions	Cum. 33 wks 1960 millions	Chge '59-'60 %
All Heavy Construction	$455.1	$14,819.4	+ 9
By Ownership			
PRIVATE	238.9	7,936.1	+19
PUBLIC	216.2	6,883.3	− 2
State & Municipal	158.5	5,267.7	+ 7
Federal	57.7	1,615.6	−21
By Type of Work			
PUBLIC			
Waterworks	5.8	307.1	+10
Sewerage	10.3	384.3	−10
Bridges*	15.6	498.6	+16
Highways	58.9	2,124.3	+ 3
Earthwork, Dams & Waterways	28.8	527.8	−12
Buildings:			
Excl. Housing	56.9	1,552.5	−13
Housing	26.8	443.2	− 8
Unclassified	13.1	1,046.9	+ 8
PRIVATE			
Buildings:			
Mass Housing	150.4	4,083.6	+35
Commercial	24.0	1,549.4	+ 2
Industrial	59.0	1,732.9	− 2
Unclassified	5.5	568.8	+75

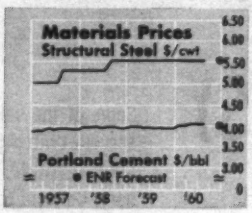
* Includes Private bridges

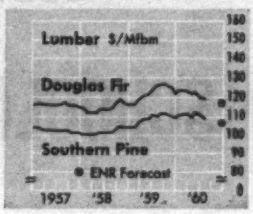
NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000 other buildings, $400,000.

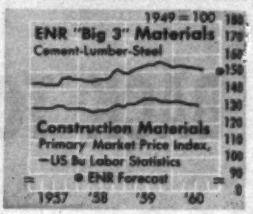
NEW CONSTRUCTION CAPITAL

	Week of Aug. 11 millions	Cum. 33 wks 1960 millions	Chge '59-'60 %
Corporate Securities	$ 36.0	$1,879.2	−23
State and Municipal:			
All Except Housing	61.4	4,382.0	+10
Housing	....	182.2	+142
Federal Loans	4.5	113.4	+23
Federal Aid	....	2,717.8	+15,000
Total Nonfederal	$102.0	$9,274.6	+41
Federal Appropriations:			
Projects in U.S.	....	$1,317.1	+325
Outside U.S.	....	157.8	+10,420
Total New Capital	$102.0	$10,749.5	+56





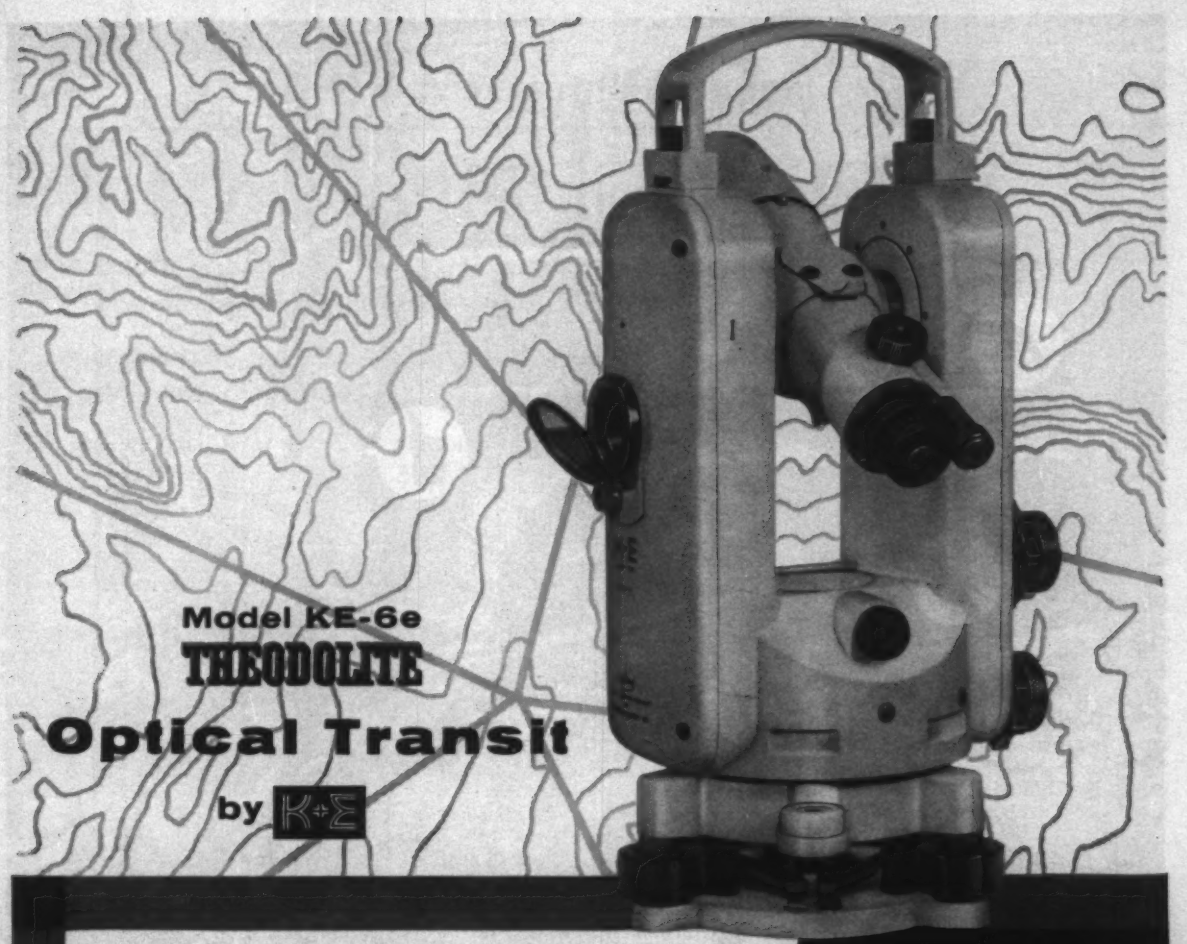




ENR COST INDEXES IN 22 CITIES, 1913 = 100

A: Revised eff. May 1, '60
B: July Index Revised

City	Construction Cost Aug. 1960	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Aug. 1960	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	649.52	−0.5	+4.1	498.56	−0.6	+0.4
Baltimore	752.00	−0.4	+1.5	559.01	−0.5	+1.8
Birmingham	654.37	0	+3.5	521.70	0	+2.7
Boston	831.04	−0.4	−0.2	561.88	−0.6	−0.2
Chicago	916.53	−0.2	−0.1	591.59	−0.4	+0.4
Cincinnati	843.70	0	+3.1	549.48	0B	+2.5
Cleveland	943.40	−0.1	+2.4	560.55	−0.2	+1.2
Dallas	639.06	0	+5.8	523.75	+0.4B	+6.8
Denver	757.31	0	+2.0	552.27	0	+2.2
Detroit	963.42	−0.3	+0.1	605.20	−0.4	+1.1
Kansas City	818.02	−0.7	+1.8	556.32	−1.0	−0.3
Los Angeles	908.20	+4.6	+3.9	563.57	0	+1.2
Minneapolis	890.16	0	+3.5	579.87	+0.6	+1.8
New Orleans	641.30	0	+1.0	509.05	0	+0.3
New York	1,040.52	−0.1	+2.4	650.14	−0.2	+0.5
Philadelphia	830.37	0	+4.5	585.22A	0	+0.6
Pittsburgh	885.14	0	+3.9	617.86	0	+2.8
St. Louis	897.64	−0.1	+1.5	581.22	−0.3	−0.4
San Francisco	884.98	0	+2.9	557.06	+0.6	+1.3
Seattle	857.25	0	+2.5	508.25	0B	+0.6
U. S.—20 Cities' avg.	830.18	+0.1	+2.3	561.21	−0.05	+1.2
Montreal	650.39	0	+4.8	466.08	0	+2.1
Toronto	697.12	0	+5.0	497.01	0	+0.4



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3. **Choice of erected or inverted (Model KE-6) image.**
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Estor® D-3 crankcase oil
for severe diesel service. Protects engines used in heavy-duty service and in the extremely high and low temperatures frequently encountered by construction equipment. Meets these conditions with outstanding oxidation resistance and detergency.

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Who Owns Military Housing?

- **Housing contractor Hal B. Hayes thinks he's found a profitable loophole in the Capehart Act.**
- **If he wins his row with the Defense Department, there'll be unexpected profits for other builders.**

A contractor who holds Capehart military housing contracts valued at $56 million to $63 million thinks he has found a legal loophole that practically makes him the owner of the buildings, not just the contract builder.

Should the contractor, Hal B. Hayes, carry his squabble with the Defense Department to the courts and win, it's possible that more than 3,400 military personnel will pay their quarters allowances to him or other private interests, instead of to the military. It would also put other contractors holding Capehart contracts in a position to retain ownership of the buildings they complete and thereby earn a good return on their investment.

The Pentagon charges that Mr. Hayes has defaulted on 3,448 housing units at five military bases; it is pressing for action by his bonding companies. The housing units are at Beale AFB, Calif.; Ellsworth AFB, S. D.; Grand Forks AFB, N. D.; Fort Bliss, Tex., and Camp LeJeune, N. C.

Until the Pentagon-Hayes fight started, the Capehart program was a routine, but slightly involved operation. Here's the way it works:

- Congress authorizes a housing project for one of the military departments. The service advertises for competitive bids from builders, the contract then going to the low bidder.
- Under the contract, the builder must form a mortgagor corporation. It obtains financing, title insurance and a surety bond and its officers are responsible for the construction.
- The mortgagor corporation must be established as a limited capital stock corporation, with the stock and resignation of the officers placed in escrow to the military at contract signing.
- The land on which the houses are built belongs to the military, but to make financing easier, the corporation is given title to the site in the form of 50-year lease-hold agreement between the mortgagor corporation and the military department. During construction, the lease is held by the mortgagor corporation. When the job is completed, the military department takes title and also takes over the corporation.

The corporation is the heart of the problem in the Hayes cases. The Pentagon says there is a legal difference between Mr. Hayes as the builder and the mortgagor corporation he organized.

Mr. Hayes apparently is assuming there is no difference, and is trying to dispose of some of his interests in the projects. This started when he tried to obtain final payment on his mortgage loan on the Beale job while there were outstanding liens and claims against him by subs and suppliers.

Mr. Hayes then was asked to escrow cash equal to the amount of the claims until final settlement. But the final payment is "only about one-quarter of what he was asked to escrow," a Defense Department official says.

The contractor charges much duplication among the claims and says it was "unreasonable" for him to bond all the claims or deposit as much cash as was ordered.

He warned if the demands were pressed he would stop work on all his Capehart jobs. When the demands continued, Mr. Hayes followed through on his threat and halted work in June. At this point, he sought to dispose of some of his interests in the projects.

These moves are being challenged by the Pentagon on the grounds that Mr. Hayes has no equity in the property. However, he contends that the value of the projects is $63 million, compared to the $56-million contract he has with the government, and that he is only trying to sublet less than 10% of that total.

Because work has stopped, the Pentagon considers the mortgagor corporation in default. A Pentagon spokesman says, however, that it has no direct right to force action, "but we will encourage expeditious action by the bonding company . . ."

Regarding Mr. Hayes' moves to sublet his interests, Defense Department officials say such agreements would be "legally ineffective." His interests—if any—are not direct but run through the mortgagor corporation required under the contract terms, the officials say.

According to the Defense Department, two things can happen:

- Mr. Hayes' lender, working unilaterally or with the bonding company, can complete work on the projects; or . . .
- The lender can make a claim against the Federal Housing Administration, which insured the project loan. FHA would then reimburse the lender and assume the lender's rights. It could complete construction with the bonding company or take over the project alone, then file a claim against the bonding company.

Legal experts in the Defense Department, however, do make one concession: The department's arguments are based on its interpretation of the law; because the law has not been tested in court, it is conceivable that Mr. Hayes has uncovered a loophole that could set a precedent.

Are Floating Bridges Allergic to Water?

Washington State's two floating bridges are misnamed. One sank once and threatened to go down on two other occasions; the other can't seem to get launched.

The "sinker" is the Hood Canal bridge, last damaged in February.

And the one that can't get near the water is the second floating span for Lake Washington. The contract for this one was awarded to Guy F. Atkinson Co. of San Francisco in September 1959, two years after the project was proposed.

The bid calls, and subsequent contract award, were delayed by a series of lawsuits challenging either the need for the bridge or its financing.

The Toll Bridge Authority eventually got out of the legal thicket, but only temporarily.

The $30-million bond issue was sold and the contract awarded August 9 to Atkinson. The same day, an owner of some of the bonds filed suit challenging the contract award.

The plaintiff charges the bid call stipulated award of contract within 90 days of bid opening, and that the state had no right to extend the time even though it was agreeable to the contractor. The plaintiff wants the project enjoined and a new call for bids.

Business in Brief . . .

• **Bundle from Ohio**—Everett S. Preston, Ohio highway director, says the state will award $130 million worth of Interstate highway contracts in fiscal 1961-62.

• **Port outlays**—Major expenditures included in the 1960-61 capital budget of the Los Angeles Board of Harbor Commission, are: wharves, $11.9 million; steel for terminal, $1.2 million; paving, dredging, and landfills, $1.1 million.

• **Aluminum experiment** – Aluminium Ltd., Montreal, will spend $4 million for a plant at Arvida, Quebec. The new installation, an experimental unit, will produce aluminum by a new process.

• **Outlays for oil**—Canadian Husky Oil Ltd., Calgary, Alberta, will spend $8 million for modernization of its refinery at Cody, Wyo.

• **Expansion in glass**—Daniel Construction Co., Greenville, S. C., has been awarded the contract for construction of a $40-million glass manufacturing plant at Kingsport, Tenn. Owner is American St. Gobain Corp. Work will start in the fall.

• **Outlays for copper**—Anaconda Co. will spend $6 million by 1961 for replacement and modernization of its works at East Anaconda, Mont.

• **Dock expenditures** – Voters of Portland, Ore. will act in November on a proposal to sell $9.5 million worth of bonds to pay for modernization of the city's docks.

• **Road contracts**—The Washington State Highway Commission will award about $40 million worth of construction contracts between now and Dec. 31. This compares to less than $20 million in the first half.

Prudential Project Sits It Out

Prudential Insurance Company's $150-million commercial center in Boston will be "moth-balled" next week when foundation work at the site is completed. The future of the project now hinges on the outcome of an expected state supreme court test of a contract that will be made between Prudential and the Boston Redevelopment Authority.

Outlook for this building complex is not as bleak as the stopwork order might suggest. These two steps toward resolving the fate of the project were taken last week.

• The state supreme court declared constitutional proposed amendments to the state Redevelopment Act that would allow the Boston Redevelopment Authority to consider the site "blighted" and thus permit inclusion of commercial buildings in the redeveloped site (ENR June 23, p. 270). This would clear the way for an Authority-Prudential agreement that would provide tax concessions for the owner.

• The legislature almost immediately passed the amending provisions that first had been given to the court for an advisory opinion.

Other provisions besides the financial concessions and inclusion of commercial buildings in a redevelopment site would allow a developer to retain ownership of the land and permit variances from local zoning requirements.

The anticipated test of the planned contract between Prudential and the Redevelopment Authority now stands as the major potential hurdle.

State and local officials and officers of the insurance company are certain that any agreement eventually negotiated will be challenged by local property owners. Threats of such action were made sometime ago, and for this reason Prudential announced that unless validity of any financial concessions was established by a court, the project would be abandoned. An earlier plan aimed at effecting a legally impregnable financial concession was unsuccessful. This plan would have permitted the Massachusetts Turnpike Authority to acquire the Prudential site and lease the air rights to the company. The rental payments then would have been turned over to the city by the authority in lieu of taxes (ENR May 12, p. 111). The court, in an advisory opinion, said the plan would be unconstitutional (ENR June 9, p. 91.)

Until the contract is drawn, challenged and ruled upon, a master contract, estimated to be in the area of $70 million, will not be let. This contract will cover construction of the buildings, including a 52-story office building.

Equipment Down

Orders drop despite strong contract pace

New orders for construction equipment dropped in June despite the record pace of heavy construction contract awards going to contractors.

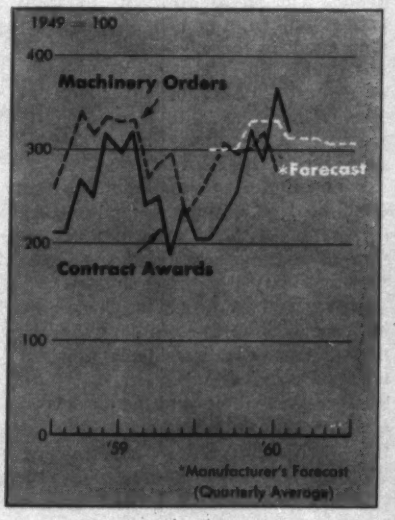
The June index of new orders for construction and mining equipment fell to 276, in terms of 1949 monthly volume as 100. The value was 13% below May and the fourth consecutive month in which orders were lower than a year ago.

The 16% drop from June 1959 is the largest year-to-year decline so far in 1960. The index is computed by the McGraw-Hill Economics Department on the basis of total orders received by companies that are predominantly makers of construction and mining equipment.

June's drop cuts the six-month order volume 5% below 1959's record first half.

By contrast, ENR's index of heavy construction contracts set a July record of 319, based on 1949 = 100. Booming awards previously had set a record for May and for June. July's pace, however, slacked off from that of June, reflecting cutbacks in mass housing and federal work, which offset gains in commercial, industrial, highways, bridges and public nonresidential building contracts. The seven-month award total is 8% above last year, compared with a 9% gain at the end of the first half.

The orders slide makes an already bleak business picture bleaker for the manufacturers who, for the most part, also are experiencing a squeeze on profit margins. As a result, the contractor who is in the market for machinery is the beneficiary of the situation.



HERE'S HOW TO MOVE 18 MILLION GALLONS OF WATER EVERY DAY

In virtually constant use, Peerless pumps insure dependable water flow to utility's 18,000 customers . . .

The Dominguez Water Corporation has a colorful history that dates back to the early Spanish land grants in California. It was first formed in 1911 and its initial patrons were farmers of land which formed a part of the historically famous Rancho San Pedro.

Today this privately owned public utility serves over 17,000 residences and 1,000 agricultural and industrial customers. Its service area comprises a 35 square mile section in the southern part of Los Angeles County.

Throughout the system, this immaculate-looking facility makes virtually constant use of Peerless pumps. Practically all of the water they distribute is pumped by Peerless. From tiny 2 hp Fluidyne pumps and large Type A booster units to mammoth deep well turbines, these sturdy pumps keep water moving in a steady flow. Many of the pumps have seen 25 years or more of continuous service. And downtime for repairs is practically nonexistent, reports operation personnel.

Years of performance. Lowest possible maintenance attention. Best service. These are typical qualities you can expect and get in a Peerless pump. Get the facts on this fine complete line of pumps now. Write today for a catalog and the name of the Peerless representative in your area.

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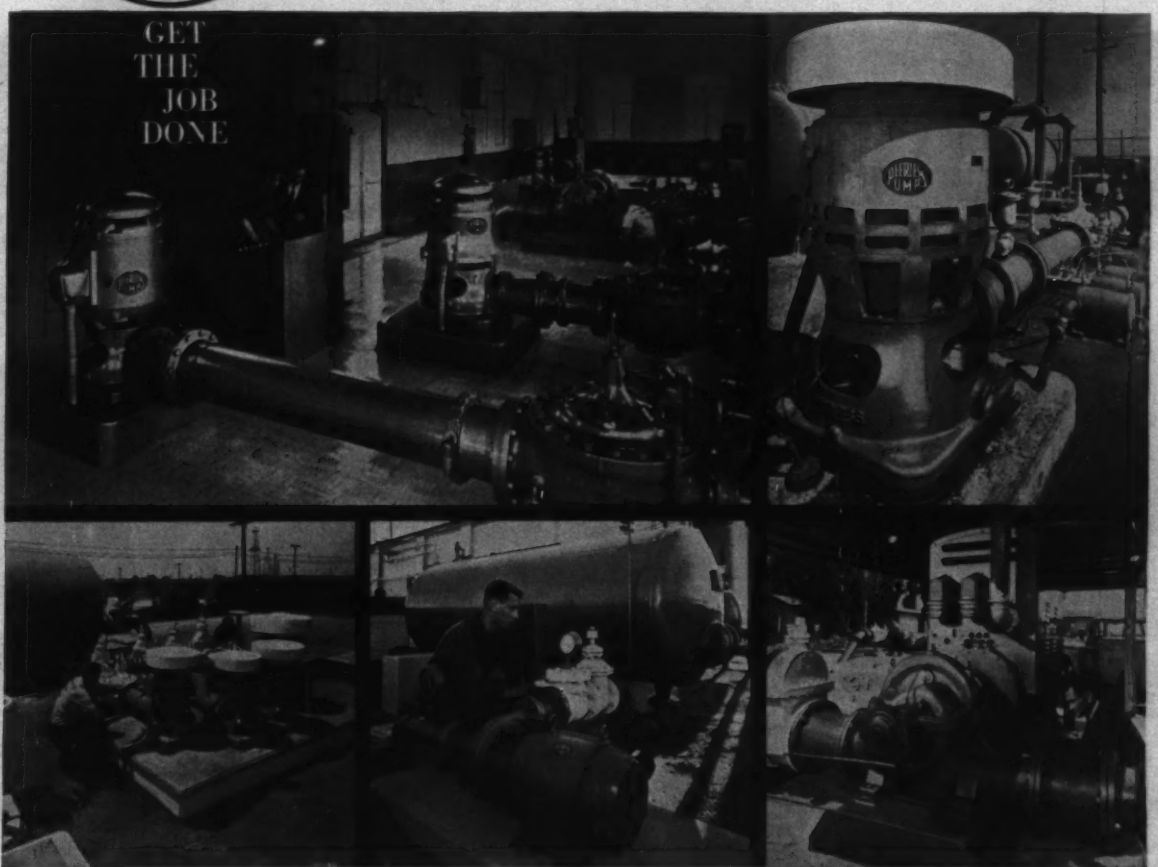

TYPICAL PEERLESS PUMP INSTALLATIONS LOCATED THROUGHOUT DOMINGUEZ WATER CORPORATION

"Best rigs for my money—they're doing an excellent job," says R. E. Robertson, superintendent of excavation for Montag-Halvorson-McLaughline & Associates on the John Day Lock and Dam project near The Dalles, Oregon. He's talking about his seven DW20Gs with Athey PW20 Wagons, carrying 112,000 lb. shot rock or glacial gravel. Five of the DW20Gs stockpiled 100,000 cu. yd. in three weeks. Day after day they make 185 three-mile round trips, pulling big loads at 32 MPH. Says Master Mechanic Huey Long, "These DW20Gs are built to stay on the job."

"These DW20Gs are really hauling sons-o-guns. We've got over 600 hours (in just two months) on them and they're doing great. And this SynchroTouch is undoubtedly the coming thing—only it's here now." This is the way R. A. Heintz describes the five DW20Gs with 482B Scrapers on Heintz & Rogers' railroad relocation project around Ice Harbor Lock and Dam in Walla Walla County, Washington. The tractor-scrapers handle both belt-loading and push-loading tasks. The versatility of these tractor-scrapers has been augmented by sideboarding for easier top loading. Hauling 25 yards of bank run gravel, the DW20Gs move 240 loads every eight hours, cycling in four minutes on the ¾-mile haul.

MORE LOADS MOVED
MORE PROFITS EARNED
WITH CAT DW20s

versatile and dependable

Look at the big jobs—where high, continuous production is a must! John Day Lock and Dam: 3,700,000 yards—Cat DW20G Tractors with Athey PW20 Wagons for prime movers. Railroad relocation for Ice Harbor Lock and Dam: 6,500,000 yards—another Cat DW20G-482B Tractor-Scraper job.

Put this versatile, dependable DW20G on your job and watch its top performance on all conditions, month after month! Its 345 HP (maximum output) Cat Diesel Engine quickly speeds it to top 35.8 MPH, cutting precious seconds from cycle time. Big power takes it up grades fast, keeping production on schedule. With interchangeable 27 cu. yd. (heaped) Cat 456B or 34 cu. yd. (heaped) 482B Scrapers or 40-ton PW20 Wagons (built by Athey Products Corporation), it loads fast—hauls fast—dumps fast. See your Caterpillar Dealer for on-the-job proof of this versatile, dependable DW20G.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

TOUCH AND GO SHIFTING WITH SYNCHROTOUCH Optional Synchro-Touch Transmission Control lets operator dial desired gear, combining split-second shifting with economical direct drive transmission. DW20G with SynchroTouch means faster shifting for faster cycles, more big payloads per hour, and reduced operator fatigue.

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POWERFUL DW20G FOR PROVED PERFORMANCE ON THE BIG JOBS

North Carolina Highway Engineers

STAGE CONSTRUCTION IN WIDTH—This new section of N. Carolina's Interstate 85 is a good example of *stage construction in width.* Two new lanes (left), built with DEEP STRENGTH Asphalt pavement, have been constructed alongside existing two lanes of Route 70 (right) to form a new section of this Interstate Highway. This combination of DEEP STRENGTH Asphalt pavement and *stage construction* is helping states to stretch construction dollars and still provide necessary highways quickly.

SOLVE TROUBLESOME SOIL AND DRAINAGE PROBLEM

Build North Carolina Interstate 85 with new DEEP STRENGTH Asphalt pavement

For new Guilford County section of Interstate No. 85, North Carolina Highway Engineers have chosen DEEP STRENGTH Asphalt pavement.

In Guilford County, engineers faced a difficult problem. The native soil in this area contains extensive strata of silty clay with high moisture content which could weaken the support of a finished road. To eliminate this threat to Interstate 85, the foundation was carefully proof-rolled with a 50-ton pneumatic tire roller to locate weak areas. These areas were then strengthened by replacing silty clay with suitable materials or installing necessary sub-drainage. It was only after this painstaking effort that actual construction of the pavement structure was begun.

In building this new part of Interstate 85, N. Carolina engineers followed several precepts of DEEP STRENGTH Asphalt pavement design. Notice in pictures and cross-section (below) the use of **6 inches of Asphalt base under 2 inches of Asphalt concrete surface course . . . Asphalt surface treated outside shoulder . . . depressed median for good drainage . . . heavy proof-rolling of the subgrade . . . and use of high-contact pressure pneumatic tire proof-roller on the aggregate base course.** Here is strength and durability!

When designed like this—for DEEP STRENGTH—Asphalt pavements *will carry the heaviest traffic loads without distress and with minimum maintenance.* Also, use of Asphalt pavement avoids high repair costs due to damaging action of de-icing salts experienced on other pavement type.

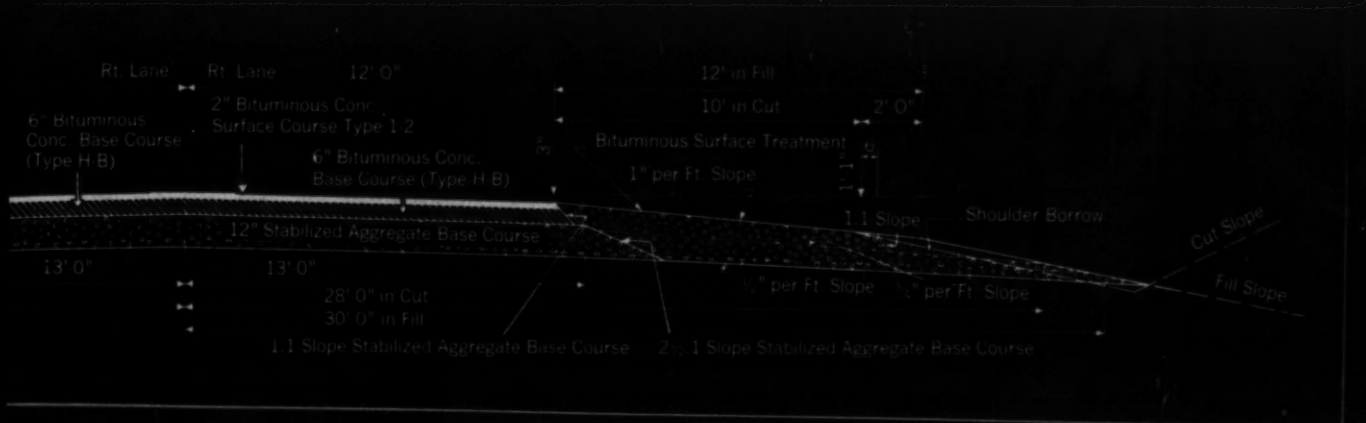
BEST USE OF ROAD FUNDS

State after state is finding that when Interstate Highways are built with Advanced Design DEEP STRENGTH Asphalt pavements, the optimum use is made of road building funds. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for more expensive Asphalt concrete surfacing. In addition, when Asphalt treated base is used in place of untreated base, reduction in total structure thickness may be allowed.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

Heavy compaction—This 50-ton rubber tire roller was used to proof-roll the subgrade. The aggregate base was proof-rolled with a 25-ton pneumatic tire roller exerting 82 psi contact pressure.

Outside Shoulders of stabilized aggregate base were Asphalt surface treated for width of 10 ft. One-half inch granite stone chips provide better traffic lane demarcation.



Engineers Oppose AFL-CIO Tie

Formation of professional union at Sperry Gyroscope complicates present affiliation with trade group

A decertification election scheduled by the National Labor Relations Board for workers represented by an engineering union at Sperry Gyroscope Co. is further complicated by efforts to form an independent professional union to represent those who oppose the present union's recent affiliation with an AFL-CIO trade union.

Emergence of the new group, known as Scientists and Engineers Association (SEA), is interpreted by some as pressure to force Engineers Association, which is the present union, to rescind its affiliation with AFL-CIO Vice President James Carey's International Union of Electrical Workers.

The developments at Sperry are of particular significance because they dramatize the basic conflicts between professionalism and trade unionism and between a mixed and purely professional bargaining unit.

The present crossroads in EA's search for a national voice for employed engineers has been reached after unsuccessful affiliation with a national federation of unions that represent professionals, and after futile efforts to form a new national federation of unions representing both professional and technical personnel. EA considered its decision to join IUE the next obvious approach to the problem.

Lisle L. Wheeler, vice president for engineering at Sperry, has appealed to both the SEA and decertification groups to avoid confusing a simple issue. That issue, he said, is: "Should EA-IUE be decertified?" Mr. Wheeler has asked for a flat decision on that issue now.

It is not clear from the legal point of view what the SEA group can accomplish at this point except possibly to press for further hearings to delay or postpone the decertification election in the hope of forcing a voluntary disaffiliation from IUE in the meantime.

A spokesman for the NLRB said SEA's chances of getting on the decertification ballot would probably depend on what SEA could prove about its status at the time the election was scheduled (ENR Aug. 11, p. 97). Further delays could develop in getting a determination on the bargaining unit SEA proposes—a unit composed entirely of professionals and including only engineers, metallurgists and scientists.

The management at Sperry has urged its engineering personnel to vote against EA-IUE in the election on the theory that affiliation with a production union is not in the "best interests" of engineers.

Carl A. Frische, president of Sperry, in a letter to the engineering staff, said he was glad the election has been scheduled and affirmed his belief in the democratic method of free election. He pledged Sperry's management, regardless of the outcome of the election, to work toward "continued improvement of the working conditions and the economic status of engineering employees."

The EA affiliation with IUE was approved by members of EA only. In the decertification election, Sperry workers who are represented by EA but who have not joined EA will have a chance to vote. So far, they have only two choices: No union, or EA as an IUE affiliate.

Commenting on the election, EA President Charles Hall said that nonunion members of the Sperry engineering staff do have the right to be represented or not represented by a union, but he said they do not have the right to tell the union what to do unless they first join the union.

Senate Unit Ok's Picketing Bill

Sponsors of the construction industry's controversial situs picketing bill may have won a Phyrrhic victory last week.

The bill was favorably reported by a Senate Labor Committee subcommittee.

Sen. Barry Goldwater (R., Ariz.) immediately charged that the subcommittee's approval was obtained without a quorum.

Voting for the bill in the seven-member subcommittee were three Democratic Senators: John Kennedy of Massachusetts, Pat McNamara of Michigan and Jennings Randolph of West Virginia. Senator Goldwater, who would have made a quorum, was verbally present but physically absent —he got as far as the door but refused to cross the threshold of the committee room.

Senator Kennedy said the subcommittee's approval is valid because a majority of those actually present is a quorum for executive session purposes.

Union Workers Average $3.65

The U. S. Labor Department's Bureau of Labor Statistics has come up with some new bench marks that may prove useful to those who are still negotiating construction industry labor agreements.

The bureau reports that union construction wages rose 4.1% during the year that ended June 30. This pushed the estimated average wage scale of all union building tradesmen to $3.65.

In terms of cents per hour, the average increase amounted to 14.3 cents. The 12-month increase for the seven trades surveyed ranged from an average of 12.2 cents an hour for building laborers to 19.6 cents an hour for electrical workers (see table).

Result, the bureau says, is that the over-all level of wage rates for union building trades workers on July 1, 1960, was 77% above the average for the three years 1947-49.

Surprising to many, perhaps, is the bureau's disclosure that fringe benefits, which are not included in the hourly increases or pay scale figures, are still spotty and nonuniform.

In over half the 100 cities surveyed, for example, no welfare, pension or vacation benefits are reported for bricklayers, carpenters, painters, plasterers or laborers. Electrical workers, on the other hand, receive one or more of the benefits in all but two cities, plumbers in all but 26 cities.

The computation of fringe benefits as a percentage of base pay, rather than as a flat sum in cents per hour, is still quite prevalent. The percentage system was in use as of July 1 in 24% of the cases reported by the bureau.

Trade	Average Hourly Increases June 30, 1959-July 1, 1960	Average Rate Levels July 1, 1960
Bricklayers	13.1¢	$4.18
Carpenters	14.3	3.77
Electrical workers	19.6	4.00
Painters	15.2	3.54
Plasterers	13.2	4.01
Plumbers	12.6	4.01
Building laborers	12.2	2.78
All trades	14.3	3.65

Labor in Brief . . .

• **Equipment operators**—The Western School of Heavy Equipment Operation has trained more than 1,000 operators for the construction industry during its three years of operation. Located in Weiser, Idaho, the school is owned and operated by the Oregon and Idaho Chapters of Associated General Contractors.

• **Goodwill tour**—William A. Calvin, international president of the boilermakers union, will make a goodwill tour to Indonesia and Australia under the auspices of the U. S. State Department in September. This will be the third such trip for Mr. Calvin, who visited several Latin American countries in 1958 and India in 1959.

• **Curbs on strikes**—A University of Michigan Law School professor has included three highly controversial suggestions in a proposal to give the government more power to prevent or settle major strikes: The power to eliminate union shop agreements in some industries, the power to modify the rule that a union represents both members and nonunion members in the bargaining unit, and the power to ban the right to make labor agreements retroactive.

• **No contracts, no jobs**—Some 4,000 highway construction workers in Delaware will face a scarcity of job opportunities this winter. The State Highway Department's chief engineer says the legislature failed to provide funds for new construction and the department has not been able to let new contracts.

• **Union referrals**—The union referral provisions of the construction industry's pre-hire clause in the Landrum-Griffin law may have made the Mountain-Pacific limitations on hiring hall agreements academic. Solicitor of Labor Stuart Rothman says he expects the issue to be considered in the Supreme Court's coming review of the Mountain-Pacific doctrine.

• **Political endorsement**—The AFL-CIO has abandoned its decision to hold fire until Congress adjourns its August session and now is expected to endorse the Democratic presidential ticket when its General Board meets in Washington August 26. The earlier "wait and see" plan had led to cancellation of the board meeting first scheduled for Chicago August 17.

• **The price of omission**—The plumbers union has been warned by its general president, Peter T. Schoemann, that failure to train and to supply competent mechanics is an invitation to the industrial unions to take over the work of building tradesmen. "We are engaged in a fight for our lives in the labor movement today," he said.

• **More jobs**—Employment in construction picked up more than seasonally last month and rose to 3,102,000. This is 120,000 more than in June and 67,000 higher than a year ago. Total employment remained virtually unchanged at 68.7 million. Total unemployment fell by 400,000 to 4 million, yielding a seasonally adjusted rate of unemployment of 5.4%.

• **A new pact**—A new three-year labor agreement between Bay Counties Civil Engineers and Land Surveyors Association and operating engineers Local 3 in San Francisco provides for a 6% wage increase this year and a 5% increase each of the following years. This brings the basic rate of instrument men to $3.82. The new rate for senior inspector is $4.13.

Is Productivity a Wage Yardstick?

General Electric Co. has opened an oblique attack on the now familiar Eisenhower idea of using productivity increases as a ceiling on wage increases to avoid wage inflation.

The company attributes little meaning and no short-term significance to productivity figures. It suggests that their use as a yardstick in collective bargaining may boomerang because they can promote a dangerous and "unnatural distribution" of the fruits of progress.

The company now faces what it calls "astronomical" demands from the International Union of Electrical Workers, whose five-year labor contract expires October 1. It accuses one union official, presumably IUE President James Carey, of proceeding on the theory that the company's increases in productivity—which G. E. calls a "presumed estimate"—should be funneled off for the sole benefit of workers regardless of the economic effects or the interests of others who have contributed to the increases.

In a new eight-page pamphlet on productivity, dedicated to the development of a well-informed public opinion, G. E. defines productivity as "the efficiency with which goods and services are produced."

It finds that productivity is the result of so many factors that its measurement becomes "an extremely difficult and often questionable process." None of the methods, it says, is exact or reliable and even the most logical method shows an annual average productivity increase of not much more than 2%.

But this index, G.E. argues, has no application to the question of whether a particular wage increase is proper in a particular situation. At best, it is merely a "rough" bench mark against which to judge the inflationary quality of the national average of wage increases.

In any event, G.E. says, neither labor nor management can independently decree the distribution of productivity gains. The controlling voice is that of the buying public.

The lesson for the future, according to G.E., is "that employment cost increases to unwarranted levels will not work and will only limit competitive opportunity, reduce incentives to invest and innovate, harm jobs, and thus hamper the economic performance of individual businesses and industries—and in consequence stunt the nation's economic growth."

G.E. does not define "unwarranted" wage increases. It does suggest that wages should not exceed "the market value of employee contribution" and that the end result of any enterprise that wants to stay in business must represent a value that customers here and abroad will be "able and willing" to buy.

The real problem, the company asserts, is to increase productive efficiency and to convert that increase into values and prices that will secure markets, steady customers and jobs.

OFFICIAL PROPOSALS

Bids: October, 1960

Kingdom of Thailand Royal Irrigation Department Bangkok, Thailand

INVITATION FOR BIDS—NO. YS-3-3

The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed written bids for furnishing and delivering the following equipment either fob Contractor's shipping point or cif Bangkok Wharf, Thailand, for the Bhumiphol Power Plant, Yanhee Multipurpose Project, Kingdom of Thailand, in accordance with the Contract Documents, for:

Furnishing one (1) generator isolated-phase type bus structure, and two (2) each generator switchgear assembly including generator protective equipment, generator neutral grounding equipment cubicles and one (1) double-ended station service unit substation.

Invitations for Bids will be issued in August, 1960, and will be opened in October, 1960. Copies of Contract Documents, Invitation for Bids—No. YS-3-3, Generator Bus, Switchgear, Protective Equipment, Neutral Grounding Equipment and Station Service Unit Substation, may be obtained by qualified Bidders on written request to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado

Each request must be accompanied by a check or money order, payable to the Royal Irrigation Department, in the amount of U. S. $25.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand

Bids: September 8, 1960

Construction of Water Supply System

NOTICE TO BIDDERS
LOCH SHELDRAKE WATER DISTRICT
TOWN OF FALLSBURGH, NEW YORK

1. Sealed proposals for Contracts Nos. 2, 3 and 4 for Construction of Water Supply System in the Loch Sheldrake Water District, Town of Fallsburgh, N. Y. will be received by the Town Board in the Town Clerk's Office, South Fallsburg, N. Y. until 2:00 P.M., E.D.S.T. on September 8, 1960, and there publicly opened and read immediately thereafter.
2. The work includes the following: CONTRACT No. 2, Construction of 19,800 feet of 6", 8" and 10" Asbestos Cement Water Mains; CONTRACT No. 3, Construction of 23,000 feet of 6", 8" and 10" Asbestos Cement Water Mains and a Reservoir Foundation; CONTRACT No. 4, Construction of: One (1) Million Gallon Steel Reservoir.
3. Plans, Specifications, Bidding and Contract Documents may be examined at the Town Clerk's Office and at the Office of the Consulting Engineers, Alexander Potter Associates, 50 Church Street, New York 7, N. Y., and there be obtained upon a Deposit of TWENTY ($20.00) DOLLARS PER SET.
4. Full refund will be made to actual Bidders for return of One (1) set in good condition within two weeks after the closing date for receipt of Bids; refund for return of all other sets in good condition by bidders and non-bidders, within the same period, will be Fifty (50%) Percent of Deposit.
5. All proposals must be on the Form contained in the Specifications.
6. All bids must be accompanied by a Certified Check or acceptable Bid Bond in the amount of Ten (10%) Percent of the amount of the Bid, made payable to the Town of Fallsburgh. Said checks will be refunded to all, except the two lowest bidders, not later than ten (10) days after opening of bids.
7. The successful bidder will be required to furnish a Performance Bond conditioned upon the faithful performance of the Contract and upon the payment of all persons supplying labor and furnishing materials on the construction of the work.
8. No bidder may withdraw his Bid within Forty-five (45) Days after closing date for receipt of Bids.
9. The Town Board reserves the right to reject any or all Bids, and to waive any informality in the Bid, and to accept that proposal which, in its judgment, best serves the interests of the Town.

TOWN BOARD OF THE
TOWN OF FALLSBURGH,
NEW YORK
Mortimer Michaels, Supervisor

Date: August 18, 1960.

Bids: August 31, 1960

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, New York, as follows:
Until 11 A.M. Wednesday, August 31, 1960
For Narrows Bridge Contract No. NB-5B-Brooklyn Anchorage. The bid must be accompanied by a deposit in the amount of $250,000.00.

and

For Narrows Bridge Contract No. NB-5S-Staten Island Anchorage. The bid must be accompanied by a deposit in the amount of $250,000.00.

The contracts include excavation and concrete construction, erection of steelwork furnished by others, surface roadway construction and other incidental work.

Bidders may submit bids for either one or both anchorages separately or they may submit a combined bid for both anchorages. If a combined bid for both anchorages is submitted, separate bids for each anchorage must also be submitted, in which case the total bid deposit required shall be $500,000.00.

Plans, specifications and contract documents may be purchased at the office of the Authority for $50.00 which will not be refunded.

Bids: September 1, 1960

Construction of Maintenance Building for Niagara Power Project in Lewiston, Niagara County, New York

POWER AUTHORITY OF THE STATE OF NEW YORK
ADVERTISEMENT FOR PROPOSALS
FOR
SPECIFICATION NO. PA-N-23039
NIAGARA CONTRACT NO. N 28

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for construction of the Maintenance Building for the Niagara Power Project, in Lewiston, Niagara County, New York, until 10:30 A. M. Eastern Daylight Saving Time on the 1st day of September, 1960, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work under this contract consists of a building approximately 190 feet by 100 feet having a steel frame and precast concrete wall panels.

The estimated quantities of the principal items of work are as follows:

4,500 cu. yds.	Excavation, unclassified
2,100 cu. yds.	Foundation course crushed rock
6,600 gals.	Bituminous macadam penetration method
1,000 cu. yds.	Concrete
140,000 pounds	Reinforcement bars
340,000 pounds	Structural steel
14,000 sq. ft.	Furnishing and stalling concrete blocks, various sizes
20,100 sq. ft.	Furnishing and installing steel roof decking

Also included is furnishing and installing mechanical equipment and piping, installing electrical systems complete and painting.

All work shall be completed on or before July 1, 1961.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets, no part of which will be refunded. Plans, specifications and proposal forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the total of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

District of Columbia—Hwy. Const.—Dept. of Highways & Traffic, D. C., July 25, 1960. CONSTRUCTION OF WASHINGTON CHANNEL BRIDGE SUPERSTRUCTURE, BRIDGE #1113, Federal Aid Interstate Project No. I-95-1(28)1, Invitation No. C-6115-H, consisting of 8,283,200 lbs. of Weldable Structural Carbon Steel and 5,775 cu. yds. Class BB Concrete (Wage rates have been predetermined by the Labor Dept. and will be incl. in Add. #1). "Pre-bid meeting will be held to answer questions of bidders on the project on Aug. 18, 1960, 2:00 PM, EDT, Rm. 500, Dist. Bldg., 14th and E Sts., N.W., Wash., D. C." Bid forms, plans and specifications are now available from Supv., Bid & Contract Div., Procurement Office, D. C., Room 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $30.00 per set, payable to D. C. Treasurer, (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EDT, August 30, 1960, in Rm. 424, 499 Pa. Ave., N.W.

District of Columbia—Bldg. Const.—Dept. of Bldgs. and Grounds, D. C., Aug. 1, 1960. CONSTRUCTION OF CHARLES H. HOUSTON ELEMENTARY SCHOOL, 49th and Lee Sts., N.E., Wash., D. C. (Invitation No. C-6125-B). Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Div., Procurement Office, D. C., Rm. 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $75.00 per set, payable to D. C. Treasurer, (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EDT, Aug. 31, 1960, in Rm. 424, 499 Pa. Ave., N.W.

U.S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5383) will be received at Denver 25, Colorado, until 2 p.m., Mountain Standard Time, September 15, 1960, for furnishing three (3) 300-ton traveling cranes, each crane equipped with one (1) 150-ton trolley; one (1) 150-ton trolley for interchangeable use on above cranes; and two drum-type hoists for lifting any 150-ton trolley for Trinity, Clear Creek and Spring Creek Powerplants, Central Valley Project, California. Delivery is desired within 450 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5387) will be received at Weslaco, Texas, until 10 a.m., Central Standard Time, September 22, 1960, for furnishing labor and materials for clearing, earthwork, concrete lining, and structures for rehabilitation of F Lateral System, Mercedes Division, Texas, Lower Rio Grande Rehabilitation Project. Location Weslaco, Texas. Principal items are 664,200 cu. yds., constructing embankments; 12,150 cu. yds., concrete in lateral lining, 1,746 lin. ft., furnishing and laying 15- through 72-inch diameter concrete culvert pipe with rubber gasket joints; 117 gates, furnishing and installing 14- through 48-inch diameter cast iron slide gate; and other work. Completion time 1,100 days. For particulars, address Bureau of Reclamation, P. O. Box 1609, Amarillo, Texas; P. O. Box 357, Weslaco, Texas; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: August 25, 1960

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 25th day of August, 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

OFFICIAL PROPOSALS

OFFICIAL PROPOSALS

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 353 Broadway, Albany, New York						
Albany (Int. Tour. Rte. 787)	C 60-15	Interstate Rte. Conn. 540 (Rte. 9W to Green St.)	0.08	Demolition	$85 Plans $5	$1,500
Rensselaer (Rte. 154)	R.C. 60-54	Spring Ave: Troy-Poestenkill, S.H. 571	0.35	Asph. Conc. = 0.30 Mi. Misc. Work = 0.05 Mi.	$3,500 Plans $5	61,000
Schenectady	FATL 60-1	City of Schenectady: Crosstown Conn., Arterial Hwy. FAC 57-18 Schenectady Crosstown Conn. Pt. 2, S.H. FASH 57-20, Proj. U-323(19)	2.13	Electrical Lighting Facilities	$8,700 Plans $5	159,000
DISTRICT No. 2, L. Keychum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Oneida (Rte. 12B)	R.C. 60-140	Oriskany Falls Village, S.H. 5385 Oriskany Falls-Deansboro, S.H. 5406 Deansboro-New Hartford, S.H. 761	5.76	Asph. Conc. Ty. 2A	$9,000 Plans $5	166,000
DISTRICT No. 3, E. E. Towlson, District Engineer, 333 E. Washington St., Syracuse, New York						
Onondaga	FATC 60-7	City of Syracuse: Bear Street Arterial Highway, FAC 56-4, Proj. U-1154(2)	0.82	Traffic Signals	$2,000 Plans $5	36,500
Onondaga (Int. Tour. Rte. 81)	FIC 60-17	Int. Rte. 505: City of Syracuse-Oswego Blvd. (Hiawatha Blvd.-North Salina St.) Proj. I-81-2(23)	1.42	Roadside Development	$4,000 Plans $5	77,000
Onondaga (Rte. 48)	R.C. 60-143	Baldwinsville Village: S.H. 1634 Baldwinsville-State Fair Grounds, S.H. 8496	4.51	Asph. Conc. Ty. 1A	$20,000 Plans $5	361,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal Rochester 1, New York						
Monroe (Rte. 65)	FARC 60-136 PSC 6015	Clover St., S.H. 294: Elimination of Grade Crossing of the New York Central R. R. (West Shore Branch) with Clover St., Proj. S-462(3)	1.17	Asph. Conc. Ty. 1A = 1.15 Mi.; Misc. Work = 0.02 Mi.; R.R.G.S. Comp. I Beam, 3 Sp., 147.8' 1 Plate Gird Bridge, 164.80'	$55,000 Plans $5	1,031,000
Monroe (Rte. 252)	FARC 60-137	Rochester-Scottsville, Pt. 2, S.H. 79 Ballantyne Bridge-Pittsford, Pt. 1, S.H. 8443 Proj. U-600(7)	0.52 (0.87 Acc.)	Cem. Conc. = 0.45 Mi.; Asph. Conc. = 0.46 Mi. Double Surf. Treat. = 0.23 Mi. 1 Br. Comp. I Beam 3 Sp. 224' Tot.	$40,000 Plans $5	742,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Cattaraugus	FAC 60-13	City of Olean: East-West Art. Hwy. (East State Street: Union Street to Barry Street) Proj. U-141(6)	0.14	Asph. Conc. Ty. 2A = 0.09 Mi. Misc. Work = 0.05 Mi.	$4,000 Plans $5	70,000
Chautauqua (Rte. 5)	R.C. 60-142	Southwestern Blvd, Pts. 9 & 10, S.H. 1852 Irving-Silver Creek, S.H. 8452	2.73	Asph. Conc.	$21,000 Plans $5	335,000
Niagara	FAC 60-3 FASH 60-1	City of Niagara Falls: Hyde Park Blvd. (Jerauld Ave. to Lockport Rd.); Hyde Park Blvd. (Lockport Rd. to Bireh Ave.) Proj. U-UG-1128(4)	0.43	Asph. Conc. Ty. 2A = 0.37 Mi.; Misc. Work = 0.06 Mi.; R.R.G.S. Comp. WF Beam Bridge 343' Total span	$80,000 Plans $5	1,436,000
DISTRICT No. 6, Wm. J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Allegany Chemung Schuyler Steuben, Yates	R.C. 60-134	13 Various StateHighways in District 6 on Routes 13, 17, 21, 70, 70A, 228, 230, 364, 371, 408	32.84	Subsealing Cem. Conc. Pavt.	$16,000 Plans $5	296,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee Street, Watertown, New York						
Franklin (Rte. 30)	R.C. 60-139	Malone-Duane, Pt. 2A, S.H. 5668; Malone-Duane, Pt. 2B, S.H. 8085, Duane Center-Mountain Pond, S.H. 9007	9.08	Asph. Conc. Ty. 1A = 9.06 Mi. Misc. Work = 0.02 Mi.	$137,000 Plans $5	2,499,000
Jefferson (Rte. 12F)	R.C. 60-129	Cape Vincent-Watertown, Part 3, S.H. 1182	0.01	Asph. Conc. Ty. 1A Culv. Replacement	$1,100 Plans $5	20,000
Lewis (Rte. 26A)	FARC 60-135	Naumburg-Croghan, S.H. 1192 Lowville-Croghan, S. H. 1193 Proj. S-883(3)	1.78	1" Asph. Conc. Ty. 1A	$22,000 Plans $5	377,000
DISTRICT No. 8, K. G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Columbia (Rte. 22)	R.C. 60-133	Austerlitz-Flatbrook-New Lebanon, Pts. 1A & 1C Flatbrook-Massachusetts State Line, S.H. 8514	0.83	9" Cem. Conc. Pavt. 12' & 17'	$11,000 Plans $5	197,000
Orange (Rte. 17K)	FARC 60-131	Cochecton Turnpike, Pt. 1, S.H. 113 Proj. U-483(6)	0.64 (0.34 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' Var. = 0.80 Mi. Asph. Conc. Pavt. = 0.18 Mi.	$30,000 Plans $5	522,000
Orange (Rte 218)	R.C. 60-141	Cornwall-West Point, Pts. 1 & 2, S.H. 5498	2.99	Asph. Conc.	$9,000 Plans $5	160,000
Ulster (Rte. 28 to 9W)	FASH 60-6 S.H. 60-7	Kingston By-Pass, Part 2 (Route N. Y. 28 to Kingston-Rhinecliff Bridge Approach) Proj. FG-U-395(6)	4.32 (5.07 Acc.)	9" Cem. Conc. Pavt. = 6.84 Mi. Asph. Conc. = 0.87 Mi.; F.C. Gran. Mat. Ty. A = 0.26 Mi.; T.C. Gr. Grav. = 0.89 Mi. Grad. = 0.38 Mi.; Misc. Work = 0.15 Mi.; 4 H.G.S. Comp. I Beam, 3 Sp. 118.5'; 2 Sp. 189', 4 Sp., 179'; 4 Sp., 181.3'; 1 Br. Welded Pl. Gird.; 3 Sp.; 404'; 1 RRGS, Prestress, Conc. Beam 3 Sp., 150.5'	$445,000 Plans $10	8,086,000
DISTRICT No. 9, J. C. Fredrick, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Rte. 369)	FATS 60-13	Chenango Towpath, S.H. 175, Port Crane-North Fenton, S.H. 963, Proj. S-851(3)	6.69	Traffic Signs	$450 Plans $5	8,000
Schoharie	FASS 60-10	Lyker Road (Cr), Corbin Hill Road (Cr) Proj. S-577(1)	3.53	Bit. Double Surface Treat. Pavt.	$22,000 Plans $5	398,000
Sullivan (Rte. 17)	FATS 60-14	Bloomingburg-Monticello, Pt. 2, S.H. 5457 Bloomingburg-Monticello, Pt. 1, S.H. 5510 Proj. F-495(16)	11.52 (4.49 Acc.)	Traffic Signs & Delineators	$5,000 Plans $5	92,000
DISTRICT No. 10, A. M. Sarr, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau (Rtes. 107, 27)	FARC 60-130	Massapequa-Glen Cove, S.H. 9017; Conduit Blvd. Pts. 3, 4, & 5, S.H. 1699A, 1699B, 5701A Proj. US-377(6); Proj. U-947(21)	5.27	Roadside Development	$3,000 Plans $5	56,000
Nassau	LP 60-1 MSP 60-1 WSP 60-2	Loop Parkway Meadowbrook State Parkway Wantagh State Parkway	....	Repairs and Misc. Work at 9 Bridges	$17,000 Plans $5	293,000
Nassau & Suffolk (Rte. 27 & 110)	FARC 60-138	Conduit Blvd., Pt. 5, S.H. 5701A; Sunrise Highway Extension, Pts. 1, 2, 2A, S.H. 8474, 8343B, 8470 Amityville Village: Broadway, S.H. 1633 Proj. U-UG-947(19)	4.59 (3.40 Acc.)	9" Cem. Conc. Pavt. = 7.31 Mi.; Asph. Conc. = 0.36 Mi.; Misc. Work = 0.32 Mi.; 1 RRGS Pl. Girder 138.9' 2 HGS Comp. Alum. 4 Sp., 220.1', 220.1'; 1 HGS-Comp. I Beam 4 Sp., 212.5'	$375,000 Plans $10	6,839,000
Nassau & Suffolk (Rts. 24A, 107, 109, 110)	FATS 60-15	Hempstead-Farmingdale, Pts. 3 & 4, S.H. 9055, 9064; Maywood-Babylon, S.H. 53-2, 1841; Farmingdale-Maywood, S.H. 9077; Massapequa-Glen Cove, S.H. 9017; Huntington-Amityville, Pts. 1 & 2, S.H. 794, 1219; Huntington Town Line-Farmingdale, S.H. 1218 Proj. U-297(6); U-985(10); US-377(5)	23.61	Traffic Signs	$7,500 Plans $5	137,000

(Continued on following page)

OFFICIAL PROPOSALS

(Continued from preceding page)

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
Suffolk	FASS 60-11	Nicholls Road, CR 97 Proj. S-571(2)	3.12	Asph. Conc. = 3.06 Mi. Misc. Work = 0.06 Mi.	$77,000 Plans $5	1,409,000
Suffolk	FALIE 60-2	Long Island Expressway, Contract 9 (Pinelawn Road to Deer Park Avenue) Proj. U-862(27)	3.47 (3.17 Acc.)	9" Cem. Conc. Pavt. = 4.34 Mi.; Asph. Conc. Pavt. = 4.20 Mi.; Misc. Work = 0.10 Mi.; 4 H.G.S. Comp. Beam 4 Sp., 274.1'; 4 Sp., 236.3'; 4 Sp., 261.3'; 4 Sp.; 204.7'	$251,000 Plans $5	4,560,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956," being Public Law 627, 84th Congress, approved June 29, 1956, are are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in "Information for Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: October 31, 1960

International Competition Power Development

"HUINCO"
of the
Lima Light & Power Co., Lima, Peru

The Lima Light and Power Company is carrying out the scheme for the "Huinco" Power Development which is to utilize the water of the river Santa Eulalia over a net head of 1230 meters for an ultimate power output of 240 Megawatts. The site of the project is located about 60 kilometers northeast of the city of Lima, Peru. Proposals will be received by Motor-Columbus Ltd., Engineers and Consultants for Electrical Power Developments, Parkstrasse 27, Baden, Switzerland, representatives of the Lima Light and Power Co., until October 31st, 1960, for the manufacture, delivery and erection of the following equipment:

Section 1
- One (1) Steel Penstock
  Diameter 2.5 meters, working pressure 10 to 50 kg/cm2, length 560 meters.
- One (1) Steel lined Pressure Shaft
  Diameter 2.5 to 2.1 meters, working pressure 50 to 140 kg/cm2, length 1500 meters.
- One (1) Manifold
  Diameter 2.1 to 0.65 meters, working pressure 140 kg/cm2, length approximately 400 meters, for the water supply to four twin turbines.

Section 2
- One (1) Butterfly Valve
  Inside diameter 2.5 meters, working pressure 10 kg/cm2, for installation on top of the steel penstock, complete with servo motor and control-equipment.
- Eight (8) Spherical Valves
  Inside diameter 0.65 meters, working pressure 140 kg/cm2 for installation at the ends of the manifold, complete with servo motors and control-equipment.

Section 3
- Two (2) Twin Turbines
  Pelton type, net head 1230 meters, water flow 6.25 m3/s, power output about 65 MW, complete with governing equipment and oil pressure system.
- Eight (8) Turbine Pit Armour-Plating
  For the two turbines mentioned above and two future turbines.

Section 4
- Seven (7) Power Transformers
  Single phase, 28.4 MVA each, 12.5/220/$\sqrt{3}$ kV, 60 cycles, water-cooled, three of which will be connected to each three phase unit and one will serve as a spare unit, complete with cooling equipment, with provision for direct introduction of 220 kV oil pressure cables into the transformer tank.

Section 5
- Four (4) Circuit Breakers
  220 kV, min. 1200 A, 5000 MVA, alternatively 10000 MVA interrupting capacity, airblast breakers to be offered complete with equipment for the compressed air supply.

Bidders may submit proposals on any section or on several sections. The description of the project, the general bidding conditions, the specifications, the general conditions for the contract and the plans may be obtained at the office of Motor-Columbus Ltd., Parkstrasse 27, Baden, Switzerland until September 15th, 1960, upon application and payment in advance of a fee of Ten ($10.) US Dollars per set of documents, no part of which shall be refunded.

Only manufacturers who can prove a broad experience in the field they are quoting in shall apply for the instructions and submit proposals.

The right is reserved to reject any or all bids and to accept the bids deemed most favorable to the interest of the Lima Light and Power Co.

Baden, Switzerland, July 1960

Bids: August 31, 1960

New York State Road Work

NOTICE TO CONTRACTORS: THE NEW YORK STATE BRIDGE AUTHORITY, BRIDGE PLAZA, POUGHKEEPSIE, N. Y. Pursuant to the provisions of the Highway Law, and Article 3, Title 2 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 31st day of August, 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith Office Building, Albany, N. Y., on behalf of said Authority, for the following project:

ORANGE COUNTY
KURT G. RAVER, DISTRICT ENGINEER, PLEASANT VALLEY ROAD, POUGHKEEPSIE, NEW YORK

NAME OF PROJECT & MILES	DEPOSIT FOR PLANS
Contract NBB. 60-1	$5.00
BID DEPOSIT	ENGR'S EST.
$240,000	$4,406,515.00
Newburg-Beacon Bridge over Hudson River	
Contract No. 1—Substructure Piers 4, 5 & 6	

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineer, noted above, and at the office of the State Department of Public Works, 270 Broadway, New York City, and may also be seen at the New York State Bridge Authority Office at Mid Hudson Bridge Plaza, Poughkeepsie, N. Y.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned to the Bureau of Contracts in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications.

Proposal must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the NEW YORK STATE BRIDGE AUTHORITY for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, and Public Authorities Law, as set forth in "Information for Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS
FOR NEW YORK STATE
BRIDGE AUTHORITY
DR. JOHN L. EDWARDS
CHAIRMAN

District of Columbia—Hwy. Const.—Dept. of Highways & Traffic, D. C., Aug. 2, 1960. CONSTRUCTION OF SOUTHWEST FREEWAY INNER LOOP—7th St. to 11th St. (Federal-Aid Interstate Project No. I-95-1(20)1, Invitation No. C-6117-H, consisting of approx. 252,750 cu. yds. Unclassified Excavation; 61,950 lbs. Reinforcing Steel; 1,499,000 lbs. Structural Steel; and 16,102 Cu. Ft. Class A (dimensioned) masonry, Type 2. (Wage rates have been predetermined by the Labor Dept. and will be incl. in Addendum No. 1). "Pre-bid mtg. will be held to answer questions of bidders on the project on Aug. 31, 1960, 2:00 PM (EDT), Rm. 500, Dist. Bldg., 14th and E Sts., N.W., Wash., D. C." Bid forms, plans and specifications are now available from Supv., Bid & Contract Div., Procurement Office, D. C., Room 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer, (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EDT, Sept. 7, 1960, in Rm. 424, 499 Pa. Ave., N.W.

OFFICIAL PROPOSAL

RATE: $2.40 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, Class. Adv. Div., P.O. Box 12, New York 36, N. Y.

OFFICIAL PROPOSALS

Bids: August 25, 1960

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 25th day of August 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

CONTRACT NO.	TYPE	NAME OF HIGHWAY & MILES
R.C. 60-162	Rehabilitating Thru Truss Bridge over the N.Y.C.R.R.	East Syracuse

DEPOSIT FOR PLANS	BID DEPOSIT	DEPT. EST.
$5	$4,500	$80,000

Any projects in this letting that are on Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956," being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the offices of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5384) will be received at Yuma, Arizona, until 10 a.m., Mountain Standard Time, September 8, 1960, for furnishing labor and materials for Main Drain Outlet and Gila River Pilot Channel-Gila River Siphon to Colorado River-Colorado River Front Work and Levee System, Arizona. Location near Yuma, Arizona, in Yuma County. Principal items are approximately 9 miles excavation of river pilot channel; 1,178,000 cu. yds. excavation for drain; and other work. Completion time 700 days. For particulars, address Bureau of Reclamation, P.O. Bin 151, Yuma, Arizona; P.O. Box 427, Boulder City, Nevada; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

EMPLOYMENT OPPORTUNITIES

DISPLAYED RATE:
The advertising rate is $39.20 per in. for all adv. appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

UNDISPLAYED RATE:
$2.40 per line, min. 3 lines. To figure advance payment count 5 aver. words as a line.
Position Wanted ads take ½ of above rate.
Box numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Field Supervisor. Large established midwest consulting firm has permanent position in building construction supervision for thoroughly qualified and experienced man. Mechanical engineer preferred. Moving expenses paid. Send complete resume to P-4833, Engineering News-Record.

Madison, Wis. Community Planner IV. $7,668-$9,900 including longevity salary increases. Graduation from an accredited university with specialization in Civil Engineering, Architecture, Landscape Architecture or Planning and at least 4 years experience in planning. Possess ability to give high-level advice on complex problems in field of planning; in addition requires a working knowledge of platting regulations, land survey practices and precise mapping techniques, as well as of the engineering aspects of development. Registration or qualification for registration as a professional engineer and land surveyor desirable. Considerable experience in dealing with public groups essential. To be responsible for directing current planning activities of city planning department including processing of zoning changes, administration of platting regulations, and supervision of mapping section. Personnel Department, 404 City-County Building, Madison 9, Wisconsin.

Redevelopment Authority, Madison, Wis., Community Planner II $6,132 to $7,692. College graduate with major in architecture, city planning, economics, engineering, geography, landscape architecture, law, public administration, or sociology with courses in accounting plus at least two years' experience in urban renewal planning or in fiscal or accounting affairs of planning projects. Primary responsibility is to assist the director in the design of projects, formulation of research studies and surveys, and planning and controlling the fiscal and accounting affairs of the projects. U. S. Citizenship required. City Personnel Department, 404 City-County Building, Madison 9, Wisconsin.

Estimator—experienced highway and heavy construction work. Proved ability to expedite and coordinate work on hand. Established Long Island Contractor. Write P-5043, Engineering News-Record.

Sales Manager—For fast growing pre-fab metal building fabricator. Experience in same or closely related field necessary. Exceptional opportunity. Submit resume to P-5051, Engineering News-Record.

Heavy Construction Estimator with sufficient background to assemble complete estimates on dam, tunnel and heavy industrial work. Headquarters Cleveland. P-5049, Engineering News-Record.

Re-Bar Estimator—Permanent Position available immediately for experienced Reinforcing Steel Estimator. Salary High. Estimating Services Associates, Inc., 994 Farmington Avenue, West Hartford 7, Connecticut.

WHEN
Answering Advertisements

PLEASE *do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbron copies.*

Wanted—Licensed Engineers competent to design and prepare plans for Sewage Treatment Plants. State age, experience, salary requirements, when can report, references. Positions permanent. P-4972, Engineering News-Record.

Wanted—Engineers experienced in design of Water Works, pipe laying, general construction. State age, experience, salary requirements, when can report, references. Positions permanent. P-4977, Engineering News-Record.

Civil Engineer, Graduate, with experience as project engineer in charge of design of urban and rural highways, streets and other municipal projects for consulting engineering firm. Location Southwest. P-5055, Engineering News-Record.

Estimator—Commercial, Industrial and Public Buildings. Engineering background desired. Opportunity for advancement. Please give experience resume and references. Kuhn Construction Company, Charleston, West Virginia.

Wanted experienced concrete paving supt. Airport work Boston. Call Ge-6-0044.

• POSITIONS WANTED

Chief Estimator-Project Manager — Fully qualified to handle work from bidding stage to completion. Best of references. Building Construction, Heavy Construction, Sewage and Water Treatment Plants PW-5011, Engineering News-Record.

General or Project Superintendent, Mature, Sober, Aggressive, over 35 years experience, Bridges, Industrial foundations, cofferdams, caissons, concrete roads and grading. Now employed on multi-million expressway as general superintendent, an immediate change is desirable. Minimum $12,000.00 PW-5017, Engineering News-Record.

Engineer-Superintendent $1, CE P.E. (Penna.) good experience in all phases of general construction, highways, dams, water supply, heavy earth and rock, development housing, concrete structures. 4 years in Carribean Area. Capable of taking complete control, estimating, purchasing, hiring subs, owner negotiations. Presently self employed. U.S.A. min. $9,000, O.S. $12,000. George W. Berry, 1009 Sycamore Circle, Elmira, New York. Ph. REgent 2-0512.

Structural Engineer, P.E. Thoroughly experienced in institutional, commercial and industrial Bldg's. Desires association with architectural firm as Chief structural engineer. PW-4999, Engineering News-Record.

Project Manager, Sup't., Estimator Piping, Instrumentation, Mat'ls. Handling, Heavy Industrial. Aged 43, 20 years in any phase invitation to turn key. Seeks management spot with future unlimited. Prefer West of Rockies. PW-5023, Engineering News-Record.

Purchasing Agent now with major firm seeks relocation. Extensive background in estimating, supervision and project managership. Top responsibility required. Will come for interview. PW-5024, Engineering News-Record.

Bridge, Structural & Highway Draftsman. Eventually can be designer. 10 years experience. (Civil Engineer in old country). PW-5028, Engineering News-Record.

Grad. Sanitary & Structural Eng. Over 10 yrs. field & office consulting exp. on all types of sanitary projects. Will relocate for opp. for prof. advancement. PW-5021, Engineering News-Record.

AVAILABLE
Engineer-Executive
Highways, Bridges, Railroads
Heavy Construction, Design and Supervision
Available Spring 1961
For Top Overseas Position
With Consultant or Contractor
Fluent in Several Languages
Successful Record in Foreign & Domestic Field
PW-5103, Engineering News-Record
68 Post St., San Francisco 4, Calif.

ENGINEERS

OVERSEAS OPPORTUNITY

24 Month Contract on a Transmission Line in Thailand

Position open to qualified Engineer with B. S. in Electrical or Civil Engineering. Must have had experience as supervising inspector on the erection of steel transmission line towers, stringing and sagging of conductor and shield wire.

Age 30—50 preferred. Must pass physical examination and security investigation.

- Overseas Bonus
- Scheduled Overtime
- Completion Incentive
- Extra Vacation Allowance
- Medical Care and Insurance
- First Class Air Travel

Please write fully, include complete salary data to:

SVERDRUP & PARCEL ENGINEERING COMPANY

915 Olive St., St. Louis 1, Missouri

ESTIMATOR, OFFICE ENGINEER

Experienced in commercial & industrial building construction. Permanent position with progressive contractor. North central Connecticut.

P-4926, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

GRADUATE CIVIL or ARCHITECTURAL ENGINEERS

We are looking for a young, recent college graduate, with a degree in either architectural or civil engineering, for a position in our El Paso, Texas—Estimating Department. This position provides a training ground for our future superintendents and executives. It is an excellent opportunity for a young man to obtain a desirable position with a reliable firm doing all types of construction work.

ROBERT E. McKEE

GENERAL CONTRACTOR, INC.

PO BOX 562 EL PASO, TEXAS

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BUSINESS PARTNER as EXECUTIVE Vice-President and General Manager

Consulting Engineering and General Contracting Group

World Wide Contacts
Foreign and Domestic Projects

Sales experience Essential

Minimum investment $50,000.00

Annual income should equal investment
Send complete resume first letter

P-4350—Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

CONSTRUCTION SUPERINTENDENT

Minimum 15 years experience in chemical plant construction. Graduate civil or mechanical engineer preferred. Must be willing to relocate within United States.

Reply fully and in confidence to:

PAUL S. MONROE
Vice-President

SD PLANTS INCORPORATED

2 Park Avenue
New York 16, N. Y.

• *POSITIONS WANTED*
(Continued from preceding page)

Contractor's General Handy Man. B.S.C.E. Good organizer. 15 years experience—supervision, field-office engineering, layout, take off, estimating, cost control, purchasing. Prefer midwest location with medium size organization engaged in industrial work with growth potential and possibility of profit sharing. Would consider small investment. PW-5039, Engineering News-Record.

Engineer—34, BSCE 1950. Two years building inspection. 8 years with heavy construction contractor. Preference: Docks & water work. PW-5033, Engineering News-Record.

Construction Manager B.S.C.E. Registered P.E., 30 years experience responsible charge heavy construction foreign field, mainly Latin America. Experienced in estimating, cost-keeping, design and supervision. Available short or long assignments. PW-5047, Engineering News-Record.

Engineering Executive. Wide industrial, chemical and civil experience; all phases administration and management. Organize and direct large design jobs or work in consulting and exec. asst. capacities. Proposals, reports, contracts, liaison, trouble shooting, P.E. in 5 States. PW-4725, Engineering News-Record.

Office Manager—Vast experience construction and manufacturing accounting, systems set-up, structural and mechanical engineering training, read and write Spanish. PW-5101, Engineering News-Record.

Asst. Super: Competent man wishes to locate with topflight organization. Well rounded exp., 10 yrs., as Proj. Eng., on buildings & super h'wys. PW-5088, Engineering News-Record.

SALES REPRESENTATIVE

Large established grey-iron producer in the water works field desires additional sales personnel. Must be willing to travel. Engineering and/or college background desirable. Good opportunities for advancement. All replies confidential. Send complete resume and photograph to:

SW-4916, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

ENGINEERS DESIGNERS

Permanent positions with Arthur G. McKee & Company at their Cleveland offices for:

ENGINEERS, DESIGNERS, DRAFTSMEN

who are experience in any type of Steel Plant or Steel Plant Equipment design. Applications will be kept confidential.

Send detailed resume and photo to:

G. VICTOR HOPKINS

ARTHUR G. McKEE & COMPANY
2300 Chester Ave. Cleveland 1, Ohio

• *POSITIONS WANTED*

Civil Engineer; A.M. ASCE; B. CE.; M.S.C.E.; Four Years experience foundation engineering; materials testing; will relocate; Southeast. PW-4887, Engineering News-Record.

Construction Supt. General Construction. PW-4482, Engineering News-Record.

Executive, Manager, Engineer (General), age 47, BSCE, 25 yrs exp. all const. categories, 10 yrs as Deputy Installation Engineer at large Air Force Base directing the Maintenance, Operation, Programming, Planning, Engineering, Construction, Management, Fire Protection, and Crash Rescue activities. Desire to locate with aggressive company having gov. contract for similar responsibilities state side or overseas. Available September 30, or sooner. Resume furnished on request. $20,000 + exp. PW-5087, Engineering News-Record.

Materials Engineer with B.S.—Ch.E. desires a permanent location position in the Middle Atlantic States or southern New England. I have a good record of 11 years experience in testing, inspection, and supervision with 3 excellent firms with construction consultant experience. References supplied with resume. Available September, 1960. Write John T. Hutchinson, Lubec, Maine.

Prestressed Concrete Engr. 8 yrs. experience including management, production, design, sales & pricing both pre & post-tensioning work. PW-5102, Engineering News-Record.

Civil Engineer: B.CE; M.CE; prefer consultant, heavy construction, or specialist firm. 11 years varied experience, last 4 years as soils consultant. California location desired, present location Eastern Canada. Married, 1 child, age 36. PW-5066, Engineering News-Record.

Project Engineer BCE, MCE, MASCE P.E. N.Y., N.J., Conn. 9 years experience (incl. 2 yrs own office) in the structural design of comm. public industrial bldgs. Seeks position as chief engr. with builder manufacturer or Arch. N.Y. area. PW-5074, Engineering News-Record.

Civil Engineer, age 30; B.C.E.; A.M. ASCE; M. AREA; Tau Beta Pi. 7 years experience in heavy railroad construction and design. Will relocate. PW-5083, Engineering News-Record.

GIANT SALE!

CONSTRUCTION EQUIPMENT FROM MAMMOTH TRINITY DAM PROJECT

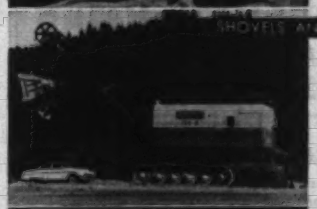
CALIFORNIA

(FOR DELIVERY LATE SEPTEMBER)

Liquidating $14,000,000.00 worth of well-maintained, top name equipment at BARGAIN PRICES!

CONVEYOR SYSTEM

2 miles long, 42" wide rubber belt. 9 flights, available individually, ranging from 672 ft. long to 1885 ft. long. Braking by electric motors acting as generators under belt load; also mechanical brakes. System includes drive-over hopper loading station for scraper discharge, screening and crushing plant, three drive-under terminal bins with total capacity of 1500 cu. yds.



SHOVELS AND CRANES

2—Model 150B Bucyrus Erie 6 cu. yd. Electric Shovels and Draglines (Note: 8 cu. yd. Dippers w/handles available for above); 1—Model 120B Bucyrus Erie 5 cu. yd. Electric Shovel and Dragline; 1—Model 38B Bucyrus Erie 1½ cu. yd. Shovel, Dragline, Backhoe, diesel; 1—Model 22B Bucyrus Erie ¾ cu. yd. Shovel, Dragline, Backhoe, diesel.

MOTOR PATROLS

9—Model 12 Caterpillar Motor Patrols, 8T, 80D, 70, and 71D Series.

HAULING UNITS

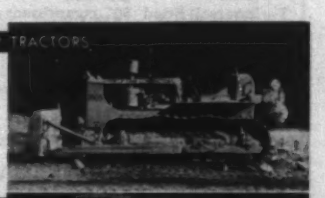
8—Model LRVX Mack Tractors w/Model 137W Euclid 30 cu. yd. Bottom Dump Trailers powered by NVH-12-B1 Cummins Engines; 10—Model PH95AC International Payhauler Tractors w/Model PW20 30 cu. yd. Athey Bottom Dump Trailers.

END DUMP EUCLIDS

5—Model 46TD Euclid End Dump Units, 15 cu. yd., powered by Model NHRBIS Cummins Engines; 10—Model 63TD Euclid End Dump Units, 15 cu. yd., powered by Model 6-110 GMC Engines.

LOADERS

1—Model 175ADS Michigan 3 cu. yd. loader powered by Model 135DKBS Waukesha Engine; 1—Model D4 Caterpillar Loader w/Model EA4 Trackson Loader.



CRAWLER TRACTORS

15—Model D9 Caterpillar Tractors w/P.C.U.'s and Dozers, 18A Series (Note: 4—Ateco Hydraulic Rippers available for above); 21—Model D8 Caterpillar Tractors w/P.C.U.'s and Dozers, 14A Series (Note: 6—Caterpillar #8 Hydraulic Rippers available for above).

RUBBER TIRED TRACTORS

30—Model DW20 Caterpillar Tractors w/Model 456P Modified Scrapers, 67C and 88E Series; 10—Model DW20 Caterpillar Tractors w/Model PW20 Athey Wagons, 88E Series; 2—Model 33LDT Euclid Tractors w/Model 32SH Scrapers.

QUARRY DRILLS

1—Model TWM2A Joy Quarry Drill w/T500 Drills, pneu. tires; 3—Model TWM-5 Joy Quarry Drills w/T500 Drills, pneu. tires.

SPRINKLER TRUCKS

1—3400 gal. Model CF523C6 Kenworth powered by Model NRT6B1 Cummins Engine; 1—3400 gal. Model R1F402 International powered by Model NHB Cummins Engine; 1—3600 gal. Model RDF192A International powered by Model JBS600 Cummins Engine; 2—6000 gal. Model 46TD Euclid powered by Model NHRBIS Cummins Engine.

DUMPCRETE

5—4 yd. Dumpcretes mounted on International truck.

ALSO:

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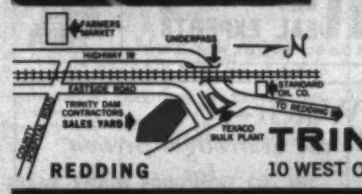

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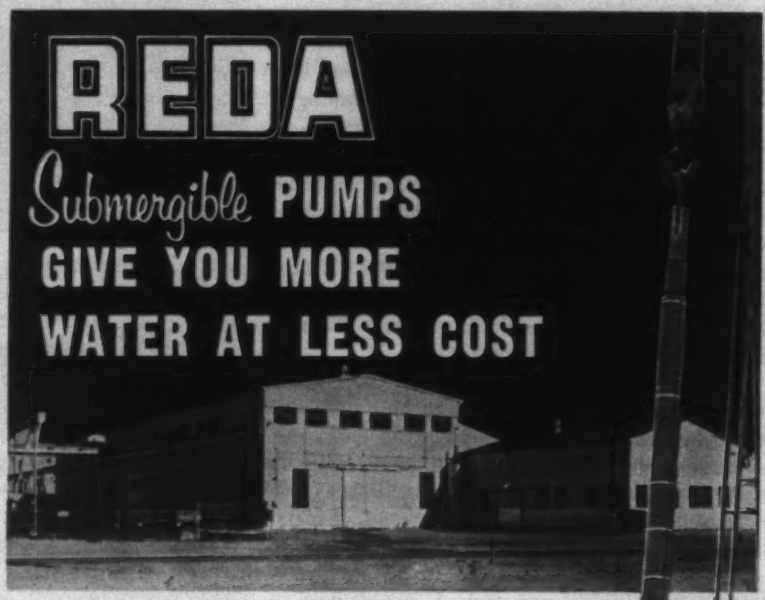

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The College Construction Boom

THE NATION'S COLLEGES and universities are expanding spectacularly. Expenditures for construction are reported to be in the neighborhood of $1 billion per year, double the rate of five years ago. It is only natural to ask: Will the rate continue to increase? How long will the boom last? And what kind of structures are the colleges building?

To find the answers, ENR dug deeply into available statistics and questioned over 500 college officials and their architects and engineers. In addition, the editors and correspondents visited more than 50 campuses to get first-hand information on the pressures behind the boom, observe the buildings under construction and learn what is planned for the future. The report beginning on p. 34 is the result.

The study reveals that the boom may last at least ten years. In fact, the tempo should increase with time, since many factors are pressuring the expansion, especially a steady rise in the number of applicants for undergraduate admission and for post-graduate courses. Continuance of the boom, however, hinges on successful financing of both operation and growth; as expenses rise, the raising of funds becomes more difficult.

Among the intriguing aspects of the expansion are the changes in campus planning and building design being brought about by new trends in education. Most significant of these are the construction of different-sized classrooms for different-sized classes, design of different-shaped rooms for different purposes, and preparation for the use of new teaching devices such as tape recorders and TV. In addition, the concept of libraries is changing; the trend is to bring students and all types of stored information closer together. In line with this concept, some classrooms are being built in libraries.

In the expansion, colleges are erecting all types of structures—dormitories, classroom and laboratory buildings, research facilities, athletic centers, student unions—but not necessarily all types on any one campus. They are building first to meet their most pressing needs, and on some campuses these are for dormitories, on others, for classrooms or research.

It is noteworthy also that many institutions of higher education are controlling their growth in accordance with master plans looking ahead a decade or more and, in one case, 75 years. The report presents principles used by outstanding planners, and shows how these are being applied to the campuses of both old and brand new institutions.

The report also makes it clear that building designers and educators face herculean tasks in making structures serve the latest educational objectives while keeping their cost within budget limitations. Classrooms have to be built with more equipment and for more students, dormitories must house a larger number of students under one roof, research facilities have to be more elaborate, gymnasiums must be bigger, often requiring longer-span framing. The report describes unconventional solutions adopted to keep costs at a level that the colleges could afford. But it is evident that designers will have to show even greater ingenuity to stretch the building dollar in the future.

The Shorter the Better

CHANCES ARE SO SLIM FOR LEGISLATION in the short session of Congress now in progress that early adjournment would probably be in the national interest. Most of the domestic measures that the President has urged for adoption are highly controversial in a political sense—medical care for the aged, civil rights, farm aid, minimum wage, housing, aid to education, to mention some. It is doubtful that Congress and the President can come to agreement on any of them.

Actually, none of these measures is really urgent, and this can readily prolong debate and promote procrastination on action. Moreover, such debate will be a waste of time since these same issues have been singled out by the party platforms as subjects for campaign oratory, which is more suitably expounded from political stumps than in the halls of Congress.

If the domestic measures cited above are lacking in emergency character, the same, however, cannot be said of those relating to defense. Here, the public is inclined to trust the President and to expect Congress to do likewise. If this session of Congress could speedily enact the foreign aid bill, the Presidential recommendations relating to Latin American aid and the foreign aid contingency fund, it would be acting in the public interest. These are measures for national security, and it is essential for the world to know that in such matters the U. S. can act positively despite domestic differences in an election year.

This session of Congress has a job to do, but it could and should be done quickly. Then and only then should the stops be pulled out for the strident notes of political debate.

Employ the Handicapped

A POSTAGE STAMP TO BE ISSUED this month pictures a man in a wheelchair operating a drill press. That man, and men otherwise handicapped, might have been pictured as well in a great variety of engineering and construction jobs—in office, shop or field. The message on this new stamp, which is also the theme of the World Congress of the International Society for the Welfare of Cripples opening Aug. 28 in New York, ought not to be lost on construction's employers. It is: "Employ the handicapped," and be assured of industrious workers with below-average absenteeism and accident rates.

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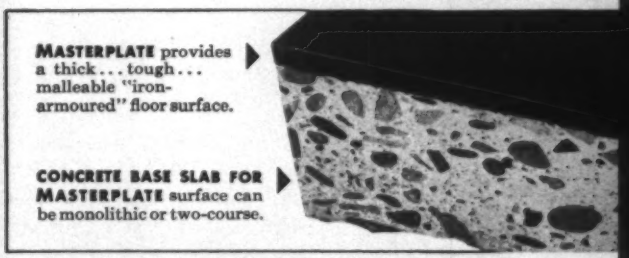
TRACER LIGHTS show heavy traffic flow pattern along "towveyor" line and on truck-loading dock at Associated Grocery, Inc., Dallas, Texas • Douglas Simril, General Manager • Consulting Engineers: Mullen and Powell • Contractor: Carpenter Bros. • Floor Contractor: Mobley and Speed—all of Dallas, Texas.



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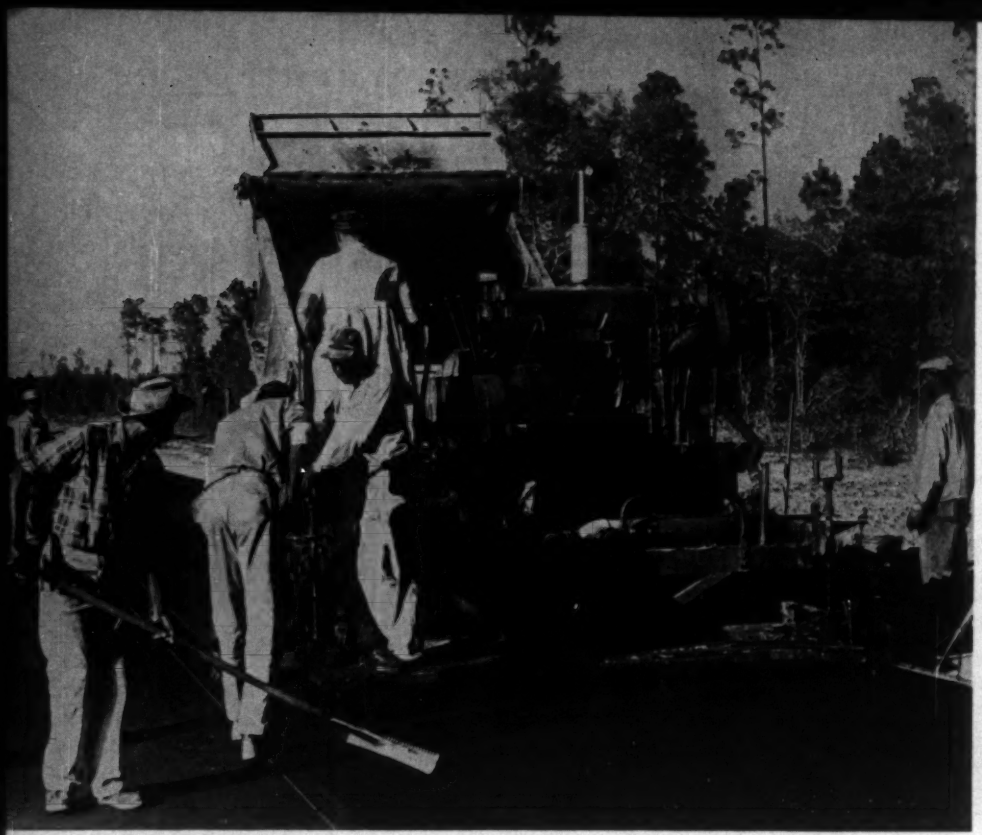

Laying second course of plant-mix Texaco Asphaltic Concrete pavement on highway through Ocala National Forest.

View of right of way cut through virgin forest for new highway. Limerock foundation at left is ready for Texaco Asphalt pavement.

Contractor: MARION CONSTRUCTION COMPANY, Ocala, Fla.

Builds Asphalt highway through virgin forest

The Florida State Road Department has constructed 13 miles of Asphalt-paved highway through the Ocala National Forest, in the state's northeastern corner. All but half a mile of this highway is located on new right of way, cut through virgin forest and swamp.

Plant-mixed Texaco Asphaltic Concrete, laid in two courses with a combined thickness of three inches, gives this highway a highly durable and resilient surface. Supporting it is an 8½ inch foundation of limerock. A Texaco Asphaltic Concrete pavement like this one withstands hard usage year after year with a minimum of maintenance. It is speedily laid and ready for traffic, because it requires no time consuming curing period. Motorists prefer the velvet smooth riding quality of its resilient, joint-free surface. Thanks to its skid-resistant texture and the sharp visibility of traffic lines on its dark surface. Texaco Asphaltic Concrete greatly reduces the danger of accidents. Whether your highway or street project calls for heavy-duty, intermediate or low-cost paving, there is a type of Texaco Asphalt construction exactly suited to your requirements. If you would like assistance with a paving problem, our 55 years of Asphalt experience is at your service. Ask our nearest office to have one of our field representatives contact you.

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